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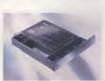
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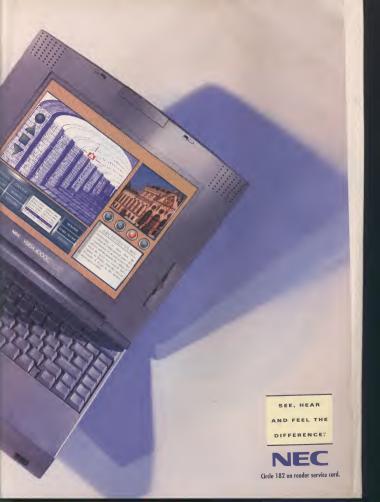


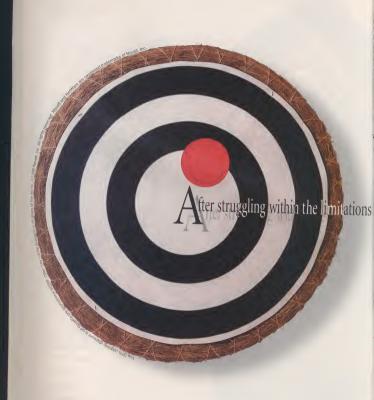
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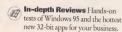
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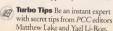


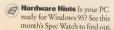
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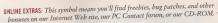
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in every possible combination to determine how they interacted at maximum speeds. In test after test, the Sportster topped them all. In fact, the Sportster proved to be more compatible with some brands than those

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transmitted the most data under the widest array of line conditions. Once again, U.S. Robotics' Sportster came in first, delivering up to 177% more data.



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# **PCComputing**

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Windows 95 Superguide Become an instant Windows expert with our fourth annual Windows Superguide. PC Computing's editors spent months scouronline sources, and technical references to assemble the most comprehensive collection of hands-on Windows 95 tips, tricks, and undocumented secrets ever published.

PLUG-AND-PLAY HARDWARE It sounds great in theory: Just install it and it works. But does Plug and Play really deliver? And how well do non-Plug-and-Play devices work with a Plug-and-Play operating system like Windows 95? To find out, we sent dozens of new Plug-and-Play peripherals-from CD-ROM drives to sound cards-into PC Computing's Usability Labs. The results are eve-opening.

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# ALSO NEXT MONTH

New! Sneak previews of the latest Windows 95 applications and hardware. Also, reviews of hot new desktop and network storage drives; workgroup servers; and low-cost, lightweight Pentium portables.

Edge Check out some sizzling sites on the World Wide Web in our I-Way Patrol section, and take the best reference and hobby CDs for a spin with CD-RON.

Help Tips and tricks for tuning your hardware and software, as well as answers to your technical questions.

Spec Watch Need a new network server? We give you tips on what to look for before you buy. Plus, special Windows 95 considerations for your hardware upgrades.

# The **Inside** Story/Jon Zilber

# ONE FOR THE ROAD

ortable Pointers: What do you get when you test 31 of the newest notebooks, 50 PC Cards, and a host of other portable peripherals? Our first-ever Mobile Superguide, starting on page S1. Thanks to exhaustive efforts by PC Computing Labs analysts Daniel Carwin, Ibrahim Gul, S. Jae Yang, and Daisv Zhao,

the notebooks were put through every performance test imaginable, including Winstone, Winbench, PCBench, and battery testing, as well as compatibility tests with the top PC Cards, And analysts Lulit Bezuayehu and Lydia M. Karlowicz set out to Mobile Mania: The answer one of the eternal mouse that soared. questions of life on the



Under Cover: Nervous about making the switch to Windows 95? Relax. We'll put your mind at ease with all the information you need to get up and running in a suite of articles featured throughout this issue. You'll find reviews of the hottest 32-bit applications and the new operating system itself (page 58). A special edition of Spec Watch that tells you what to look for when buying or upgrading hardware for Windows 95 (page 449). Plus, look for installation tips from Microsoft's own Windows 95 Resource Kit (page 358) and more. To top it all off, our own Matthew Lake and Yael Li-Ron prepared a mammoth, 40-page excerpt from their new book, Windows 95: Making It Work for You (ZD Press, 1995) to help make your transition a smooth one (page 187). But, says Li-Ron, "Writing the book was child's play compared with coming up with the right title." Here are the Top Ten (printable) titles they



discarded before finally reaching the one that stuck: 10. Yet Another Windows

9. Buy This Windows Book

or We'll Starve! 8. Make Windows Squeal

Like a Pig 7. Sex! (Now that we have your attention, please buy this book.)

6. Boutros Boutros-Windows 5. Make Windows Clean Your Shoes 4. Buy the Book Even if You Don't Get

the Title 3. Never Mind the Bollocks, Here's the Windows Book You Want

2. Steal This Windows Book And the number one rejected title:

1. Women Who Love Windows and the Windows That Ignore Them

"For some strange reason," notes Li-Ron, "none of these suggestions hit home with the ZD Press marketing folks. So we let them choose their own," Lake could not be reached for comment, as he was preoccupied with another project. He's proud of the book, but he's even prouder of another product of the fruits of his-and, particularly, his wife's-labor: Julia Jennifer Lake, (Note to the Craig Lake family: Nice name, but what happened to Boutros Boutros-Lake?) Demo of the Month: Pssst . . . wanna

buy a P6? If you're not sure, you will be after reading "Pentium Killers?" (page 106), a roundup of Pentium and Pentium-challenging systems, along with a sneak peek at what to expect from Intel's follow-up to the Pentium.

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NOTES FROM THE BUSINESS WORLD

# Windows 95: Where Is It?

hat do you mean, Windows 95 is here, in "Windows 95: It's Here (Sort Of)" (June, page 176)? Do you mean that ivory-tower journalists who can afford the luxury of messing around with a beta version determine where it is? Windows 95 is probably six months to a year from being here. What's more, out here in the real world, we have to worry about neophytes getting lost in interfaces, and we can't afford to risk our employers' capital by installing software with glitches that affect even one in a million. What about the 286 that runs the payroll? It hasn't overpaid me in years! What about productivity? ROI? Learning curves?

George D. Reeder Cary, Illinois chance to run Windows NT, Windows 95 will be the first and last version of its kind (bug fixes notwithstanding).

MIKE RUSKAI

DEAD ON ARRIVAL? Wow. Pass the Kool-Ald, please. Let's meet this same place next year and compare installed bases, shall we? Lotus (IBM's new pride and joy) publicly demos Notes Release 4 under Windows 95. I can't name a single major application developer that isn't actively working on Windows 95 apps to the exclusion of 16-bit Windows, OS/2, and Macintosh. And when someone calls looking to buy a new PC for the home this Christmas season, any sane person would have to recommend Windows 95 over Warp. EB

# **Warped Access**

I find one comment about OS/2 Warp in "Windows 95; It's Here (Sort OB)" very misleading. You state, "The one-button Internet access is slick, although we'd rather choose our own provider." If you had reviewed the software, you would have found that BMS Internet access program is configurable to other providers, while Microsoft's program is not!

MIKE GORMAN VIA THE INTERNET

IBM'S SOLUTION is one-button if you use its provider; otherwise you have to go through a many-step process to configure it. Microsoft's Internet solution, however, is configurable to any provider. EB

# Windows 99

I've heard that Windows 99 will be the next version of Windows that appears after the 95 update. If so, is it very likely that it will support Windows 386-Enhanced mode? And if the 386 gets the ax in favor of the 486, will Windows NT be made a 64-bit-only operating systemparticularly since NT already supports several other proprietary 32-bit RISC chips? With the P6 on the horizon, it's unlikely that Intel or Microsoft will support the aging 386 much longer.

Jon Hobson Plainfield, Wisconsin

YOU RAISE A COOD POINT. In my opinion, Windows 95 is the last of its generation. Its role is to bridge the gap between a world where Intel's 386 architecture dominates and one where operating systems and applications are portable between different platforms. EB

# Windows 95: DOA

I had high hopes for "Crossroads: Windows 95 vs. OS/2" in the July issue (page 186) after reading a fairly accurate account of OS/2. Then I saw your verdict with a strong Microsoft bias. I think Windows 95 will sell very well initially, but that's it. The product is basically DOA regardless of its selling status. Microsoft invested all that money in Windows 95 for the sole reason of holding off the mass exodus to OS/2.

# System Degradation

Great teaser question in the July issue (Mail, page 28): "How soon will you upgrade to Windows 952" I will not degrade to Windows 955, ever. It's a RAM gobbler that requires 16MB of RAM to work well. Earlier versions of Windows will be fine for me—they run fast, and you can run the same programs on them. By the way, I have no sympathy for Microsofts All the bashing it has been getting is called *competition!* 

ROBIN RADEZ

# The Bottom Line

How soon will people upgrade to Windows 95? That depends on who is upgrading. I consult for an accounting firm where the boss usually asks, "How much will increase the bottom line?" He doesn't accept buzzwords like increased productivity and competitive advantage without hard facts to back them up. I don't expect him to install Windows 95 on his 386 machines very soon.

At the large business where I work, it's a different story. Flash and glitz win easily over content. The management team has been to the Microsoft demos. I can tell by the



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gleam in their eyes whenever they talk about how much better their ideas will be when typed on the 32-bit, preemptive multitasking, multithreaded word processor, that we'll have Windows 95 here by the end of August. Then they'll have more time for Plue and Play! OLE! Meanwhile, we're adding two people to our support staff to handle the "increased productivity."

VIA COMPUSERVE

# No Wait for OS/2

It was truly enlightening to read "Crossroads: Windows 95 vs. OS/2" and John C. Dvorak's column, "Just Say Nose," (page 53) in the July issue.

As a direct result of the PC Computing reviews of OS/2 2.1 and then Warp. I decided to give OS/2 a try shortly after Warp hit the shelves, I enjoy being able to download files, run a search, and still

keep working on a Word for Windows document-without the fear that my system will crash. I wondered before I bought Warp whether I should just wait for what was then called Chicago, Now I wonder how long I would have been waiting, how many versions it will take for Windows to do what I'm already doing, and how much more it will cost than what I paid for OS/2.

PHILIP GRABER VIA THE INTERNET

# Overexposure

In the May issue, Ed Bott responds to a question in the Mail section ("Warped Judgement," page 27) about why we should upgrade, by stating, "Applications, applications, applications." Did he ever consider that Microsoft's marketing moonie mania is the cause for all the apps? If OS/2 got the same exposure as Windows, it might have all the applications, applications, applications.

MARK PAPSUN GREENBELT, MARYLAND

AND IF MY VOLKSWAGEN had a different engine, transmission, and body, it would be a Porsche. The marketplace is ruthlessly efficient. It doesn't respond to hype and "moonie mania"-it responds to profit. Developers don't make money writing apps for OS/2. That's why Windows and Windows applications have 90 percent of the market and deserve the amount of ink they've received in this magazine and others, EB

# Unlocking the Web

Your July cover story ("One-Click Internet," page 114) left me completely confused. When the three most popular services are Prodigy, America Online, and CompuServe, how could you omit the latter two in your article?

CHARLES A. SWENINGSEN La Habra, California

AMERICA ONLINE AND COMPUSERVE

weren't wired to the Web in time for our testing. Stay tuned for more on the Web browsers that accompany the major online services. GH

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# The Two Faces of IDE

I'm thoroughly confused. In "Gotta Get a fedgiagbyte" (July, page 134) there's a reference to IDE's 528MB limit. Yet, in almost every fine-print ad in the back of the very same issue, I see ads for IDE drives manufactured by Maxtor, Conner, Seague, and Western Digital that go all the way up to 1.27GB. Would somebody please explain this anozent contradiction?

> CAROLYN COMINGS VIA COMPUSERVE

THE 528MB CEILING is a limitation of the system you're uggrading, not of the drive itself. The Enhanced IDE standard—which uses the same architecture as IDE but improves on the technology's capacity and speed—allows for disk capacities of up to 8.4GB. To take advantage of Enhanced IDE drives, however, your system or drive vendor must supply a software driver that updates the system of Drive vendor must supply a software driver that updates the system IDE of the STANDARD CONTRACT OF THE STAND

# Life in the Dead Zone

Mr. Schwartz, you just hit a large nail squarely on the head in your column "The Dead Zone" (July, page 57). I speak for all nonprofit companies hilded with voluntees. Please donated Small budgets mean we use only donated equipment. This gets quite interesting, since we are still using Wang word processors with 8-inch floppy did you work. Yes, those old dasys-wheel priptier is known to the processor with 8-inch floppy did better than a manual typewriter.

MICHAEL SHALKEY

# The Hidden Cost of Web Surfing

Your suggested prices for getting on the Internet are ridiculous ("Maximum Impact," May, page 126). You can get your home page posted on a national Net provider for less than \$50. Some charge by the amount of hits a page receives, but that still doesn't come close to the \$18.142 or more you quote.

DANIEL HOLLIMAN VIA THE INTERNET

YOU CAN PUBLISH your own Web pages on America Online or Prodigy now, too, But the \$50 you mention,

and the price of subscribing to a service provider, doesn't give you control over your page—you're just paying somebody else to post your billboard. JOC

# For the Record

Our review of Expert Software's Expert Travel Planner CD ("All Aboard!" CD-RON, June, page 301) should have stated that the Alamo (a historical site) is included, under a listing of attractions for the San Antonio, Texas, area.

NOT ON THE NET YET? WHAT'S HOLDING YOU BACK? Send your thoughts about this and other subjects to Mail, PC Computing, 950 Tower Lane, 19th Floor, Foster City, CA 94404; fax: (415) 578-7059; Internet: 72241.1724@compuserve.com; CompuServe.27241.1724

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cable for head-to-head action.

Turn it on and experience the difference a dimension can make.

# PUSE Turning PCs into Smart



Code Bloat: Windows 95 alone requires about as much memory today as a user's operating system, applications, and data combined in 1991.



Channel Surfing: What do 15 million World Wide Web users enjoy doing most on the Internet? Browsing remains the favorite pastime.



More for Less: Prices for CD-ROM drives are slowly falling, while the drives steadily improve. Transfer rates of 600KBps in quad-speed drives are now standard. PLUG AND PUNT?

# Effortless Upgrades?

Installing a new modem, sound card, or other PC addon is a snap. We know this because hundreds of instruction manuals tell us so.

You just open your PC, install the card, plug the power cords and cables into the right connectors, reboot, load Windows, run the software-installation routine that adds or changes device lines in your system files, and fiddle with a jumper switch or two. Then, when the inevitable port, interrupt, and DMA channel conflicts arise, you do it all over again with technical support. What could be simpler?

Well, Windows 95. It automatically recognizes and assigns the appropriate system resources to the new generation of Plug-and-Play peripherals, so you shouldn't have to edit syntax-laden device-driver lines or, worse, tie your fingers in knots setting tiny jumpers. Windows 95 includes the Registry, a clearinghouse of information about your hardware and software configurations.



Smart Appliances: Adding Plug-and-Play hardware to your system should be as simple as working a toaster. But is it?

During installation, the 300 or so Plug-and-Play-compliant peripherals determine what else is onboard using the available resources. Windows 95 does the figuring, so you get hands-off loading of mice, modens, monitors, and such, and the ability to do things like swap a portable in and out of its docking station without rebooting.

Of course, if you have any experience with PCs, you know that every silver lining has its cloud. The problem is that most

of us will continue to have one foot in the past, usually tied to one or more of the gazillion non-Plug-and-Play peripherals. These legacy boards—and many new ones—lack the specific electronics needed for Plug-and-Play compatibility.

But you'll still be better off than in the past because Windows 95 can recognize more than 1,600 of the most common legacy devices. It can also coax enough information from the ones it doesn't recognize

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### **Appliances, Hard Drives to Go**

to relieve you of some although not all—IRQ and COM port guessing games.

You say you're not going to jump into Windows 95 right away? Theoretically, you can still get autoconfiguration of a Plug-and-Play board if your PC has a Plug-and-Play BIOS and Windows 3.1. (Most PCs sold during the past year have such a BIOS or can be upgraded via software available from your PC maker.)

The trouble is, confusion could arise because BIOSs come from many sources, each of which might put a slightly different spin on their Plugand-Play specifications.

Another caveat: Impressive as Plug-and-Play technology may be, its usability suffers. Not only is it less intuitive than it should be, but it also renders your tried-and-true bag of troubleshooting tricks essentially useless. Expect some improvements, though, as Plug and Play matures. MH

**Hedging Obsolescence** One way to stay close to the cutting edge in computing is to buy a new system every 6 to 18 months. The Panda Project thinks it has a better solution: the universal PC. Its boxes, called Archistrat systems, can be mixed and matched with different processors and operating systems. Equip an office with several Archistrat systems, and you can slip Alpha processors in some, and Intel processors in others. In theory, these Lego-style PCs could reduce maintenance costs and make upgrades a breeze. The catch? You'll pay a 20 percent premium up front for the convenience and the hedge against instant obsolescence WT

#### All That Storage!

lomega has figured out a way to make standard 3.5-inch hard-drive platters removable so, you can swap 5.40MB or 1GB disks in and out of its new Jaz drive the way you would a floppy disk. With a 175m average access time, it's a bit slower than most 1GB hard drives. But with its 256K cache and 5.5MBps average data-transfer rate, you won't notice. You'll never swap out a hard drive again. MH

Jaz drive / lomega Corp. / (800) 697-8833, (801) 778-1000 / \$499 est. street price, internal; \$599 est. street price, external / Reader Service No. 6co

#### All-in-One Printers

Multifunction devices that combine a printer, fax machine, and copier are back. Here are the best prices as of June 16, 1995.

Product	Price
Lumina 2093	\$469
ComputAbility Consumer (800) 554-9950	Electroni
Hewlett-Packard OfficeJet USA Flex (800) 477-7770	\$679
Panasonic KX-SP100 MidWest Micro (800) 972-8822	\$765
Brother 4500 Harmony Computers (800) 441-1144	\$899

Reader Service Numbers: ComputAbility Consumer Electronics 660; USA Flex 661: Harmony Computers 662:

#### RADAR: Speakers Under the Table, Small-time Acts

What's on the scope? If a blip is near or moving toward the middle of the radar screen, check it out. If it's moving off the screen, steer clear for now.





#### Dialed for **Nata Transfer**

When you have to go wireless, Compag's SpeedPag 192 Modem is the answer. It supports both MNP10 and ETC. and transmits at speeds up to 19.2Kbps. Compaq bundles some impressive software with the SpeedPag, including Delrina's WinComm and Compag's own Modem Advisor and Cellular Phone Manager. The SpeedPaq also supports more than 60 types of cellular phones.

If you've been waiting for those familiar red LEDs to evolve from your desktop modem to your PC Card, check out U.S. Robotics' Courier V.Everything. It gives you the same LED status lights, so there's no more guesswork about your connection. Gone are the days of compatibility worries, too-it handles V.34, V.Fast Class. V.32 terbo, and virtually any other standard on the table.

Fortunately, the Courier and SpeedPaq both are flash-ROM-upgradable. Pick up one of these models today, and you can upgrade to new speed and error-correction standards down the line. RS

SpeedPaq 192 Modem / Compaq Computer Corp. / (800) 345-1518 / \$279 est. street price / Reader Service No. 665

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forms on one of 35 uneditable generic forms or 1,400 custom corporate forms. Quicken ExpensAble includes 20 generic-but fully editable-forms. And at just \$49.95, it costs about \$20 less than QuickXpense Rs

Quicken ExpensAble / Intuit / (800) 816-8025 / \$49.95 direct / Reader Service No. 667

VISUAL BASIC 4 0

# **Visualize Better Applications**

No product has had PREVIEW how applications are built than Microsoft's Visual Basic. In moving the platform to 32 bits under Windows 95 Microsoft will release the most significant upgrade to the Visual Basic programming tool since it was first developed.

The good news about the 32-bit version of Visual Basic is its extensive OLE support and integration. The programming environment can be both an

the custom controls are OLE based. Microsoft has also included all the tools necessary to allow applications created with Visual Basic to be both OLE clients and servers. For most of us, this means OLE support in applications is not only likely to become more robust, it's also likely that everything will support it.

OLE server and client, and

The most dramatic change. however, is in the custom controls. The VBX control stan-

dard introduced in Visual Basic 1.0 has been so successful in generating thirdparty support that virtually all of the recently developed languages-from Visual C++ to Delphi-support it. But Microsoft's developers have decided that the VBX standard is dated and are introducing a new OCX and OLE customcontrol standard. While OCX is a vastly superior tech-

nology, it's a move

that's likely to throw competitors for a loop until they can adopt this new standard.

Another new addition to Visual Basic is the Enterprise Edition, which provides three critical components: a version control system, a new database engine intended to quickly suck data from large network databases, and, most significantly, a way to do distributed computing. This last feature lets programmers break out of the client-server straitjacket to a mode in which multiple tiers of OLE servers running in different locations can exchange information. This formidable new release, expected shortly after Windows 95 ships, should cement Visual Basic's commanding reputation in the market as the premier programming tool. BS

Visual Basic 4.0 / Microsoft Corp. / (800) 426-9400 / Price not available at press time / Reader Service No. 668

Contributors to Pulse: JAMES OLIVER CURY, MIKE HOGAN, MATTHEW LAKE, RICH SCHWERIN, and BARRY SIMON. Edited by WENDY TAYLOR.



Code Builder: Visual Basic's new custom controls include tabbed dialog boxes, a slider, outline control. list views, and a phone dialer.





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# Bug Bytes Quick Fixes to Software Glitches and Hardware Gotchas by Doug Vargas

#### **AST's Ascentia Has Its Own Special Effects**

Remember the "Twilight Zone" episode in which the guy is sitting in front of his computer and his cursor starts to move across the screen by itself? Scary! Well, some Ascentia 900N and 910N notebook users may experience this episode firsthand: Their mouse pointers will spontaneously wander to one side of the screen.

Fix: Relax, it's just the computer's built-in track-point calibration making a miscalculation. Simply put the machine into suspend mode by pressing the system-function and Esc keys, and then press any key to wake it up. The problem will be gone. But don't be surprised to see Rod Serling in the corner making a few closing comments.

Quattro Pro Deals Its Own Currency You've suspected for a long time that marketers are sneaking subliminal messages into advertising in the form of innocuous-tooking ice cubes and carroon camel heads. But are they hiding messages in software, too'S Some users of Novell's Quattro Pro 6.0 for Windows might think so. In every cell formatted for currency, the word Quattro is appended to the beginning of the dollar amount. For

instance, \$666.00 becomes \$Quattro666.00. Pretty sneaky! Bet they didn't think we'd notice, eh?

Fix: It's not a subliminal message. It's just a weird thing that happens sometimes. To get rid of it, pull down the Property menu, select Application, and change the currency prefix to S. Then you can relax and stop worrying about people planting ideas in your head (renew your Pc Computing subscription—do it now).

After Dark Likes the Sound of Silence As a computing professional, a big part of your job is making difficult decisions like these: Swans or toasters? Bad dogs or raindrops? How many fish, and what kind? The answers aren't always so cut to come by. But with some experimenation, you can usually find an After Dark screen-saver module that suits your mood—at least temporarily. Some users of After Dark 3.0 for Windows have found, however, that the program completely turns down the volume of their sound cards and has trouble controlling Energy Star-combiant monitors.

Fix: Berkeley Systems released an update that transforms After Dark 3.0x to 3.06, the latest version. (Download ADW306.ZIP from Berkeley Systems' support areas on America Online and CompuServe.) This solves both problems, so you can get back to making all those tough decisions.

Flight Sim Grounded by OverDrive No. doubt about; it, computers have enriched our lives by letting us do important things like make spreadsheets, create databases, and participate in online sex chats. But everyone knows that PCs are really for flight simulation. Unfortunately, some intrepid cyberpilots who use Microsoft's Flight Simulator (version 50 or 50a) have found that after upgrading to Intel's Pentium or InterDM4 OverDrive processors, their pilot licenses are suddenly revoked; the program crashes whenever they try to lumb it.

Fixe Grounded pilots should download the patch file OVERDRAZIP from the Flight Simulation forum on CompuServe (GO FSFORUM). This lets OverDrive owners update their copies of Flight Simulator so that they get along with their new processors (Note: If you don't have problems with Flight Simulator, don't use this patch). The best solution, however, is to get Microsoft Flight Simulator 5.1 (the latest version). It not only fixes this problem, but also adds great new graphics and features.



Introducing the newest innovation in computer keyboard technology — the totally cordless LightLink keyboard. Capable of 370 words per minute, the LightLink is the latest in infra-red technology, Installation is simple. Unplug the existing keyboard and plug in the base station and reboot. No software required. Typically the best performance

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range is 0-20 feet away from the base station. The LightLink cordless keyboard is a fullfeatured keyboard which is compatible with IBM AT/PS2\* computer or compatible and WINDOWS 95\*.

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# The A-List Editors' Top Picks by Wendy Taylor

		Top Pick	The Buzz	The Stats	Issue Reviewed
Systems	High- Performance Pentium	Micron Electronics P133 Millennia	Only Gateway's P5-133XL is faster— but just by a hair. And it comes with a six-speed CD-ROM drive to boot.	\$4,199, 133MHz Pentium, 16MB EDO RAM, 1.2GB hard drive.	See this issue, page 105. Reader Service No. 675
	Network Server	Digital Prioris LX 590	Our labs called it the fastest server to hit our test bench; we call it a great deal.	\$3,300, 90MHz Pentium, 16MB RAM, 1GB hard drive.	Stay tuned Reader Service No. 676
	Pricewise Desktop PC	AST Advantage Adventure 6075p	Everything you need to run a business: telephony, voice mail, fax, and lots of applications.	\$2,099,75MHz Pentium, 8MB RAM, 540MB hard drive, 4X CD-ROM.	page 67
aPortables	f. (a) (iii) a of cope i	Toshiba Satellite Pro T2150CDT	A built-in CD-ROM drive and batteries that last and last. Coming soon: a removable quad-speed CD version.	\$4,378, 75MHz 486DX4, 8MB RAM, 500MB hard drive.	See this issue, page S13. Reader Service No. 678
		Dell Latitude XP 4100T	Tough as nails, plus a battery that takes you from N.Y. to L.A.	\$3,899 to \$4,199, 100MHz DX4, 8MB RAM, lithium ion.	See January 1995, page 124. Reader Service No. 679
Printers	Desktop Laser Printer	Hewlett-Packard LaserJet 5P	You can buy a faster laser, but not a better one. Plus, who needs cables? Beam jobs to the IR port instead.	\$899, 6 ppm, 600 dpi, PCL5 (PostScript optional), infrared port.	page 64.
	Network Laser Printer	Hewlett-Packard LaserJet 4Si MX	Even 50-page print jobs fly out faster than you can trot down the hall to claim them.	\$4,314, 17 ppm, 600 dpi, PCL5, PostScript Level 2.	See Occember 1994, page 134. Reader Service No. 681
	Portable Printer	Citizen PN60	Small enough to slip into a briefcase, light enough to carry anywhere.	\$365, 300-dpi thermal transfer, 2.25 pounds.	See February 1995, page 64. Reader Service No. 682
	Personal Color Printer	Canon BJC-70	If the sleek, black design doesn't grab your attention, the color output will.	\$359, 720-by-360- dpi mono, 360-by- 360-dpi color.	Stay tuned. Reader Service No. 683
Video	High-resolution Monitor	Nanao FlexScan T2•20	It's like buying orchestra seats for Windows—and worth every penny.	\$1,380 (17-inch), \$2,163 (20-inch), Plug and Play.	See January 1995, page 142. Reader Service No. 684
	High-resolution Graphics Accelerator	Matrox Millennium	Ultrafast Windows RAM and 3-D acceleration make this the graphics accelerator to covet.	\$480, 4MB WRAM, 1,280 by 1,024 at 76Hz, PCI interface.	Stay tuned. Reader Service No. 685
Storage	Removable Storage	Iomega Zip drive	Zippety-zip. Near-hard-drive performance, and the cartridges are removable.	\$200, 25MB or 100MB cartridges, SCSI or parallel.	See June 1995, page 70. Reader Service No. 686
	CD-ROM Drive	Plextor 6Plex	There are other six-speed drives, but this one sets the standard. Now where's our jukebox version?	\$550, SCSI, 145ms access time, 256K buffer.	See June 1995, page 67 Reader Service No. 687
Peripherals	Provide to the second	Visioneer PaperPort	A paper floppy drive for your PC, and the best way to tame your paper in-box.	\$369, 400-dpi scanner, document- management software.	See June 1995, page 68. Reader Service No. 688
		Creative Labs Sound Blaster Awe32	The gaming and business standard. Sounds great, too.	\$299, 32-voice polyphony, 16-bit DSP.	See June 1995, page 162. Reader Service No. 689
		U.S. Robotics Sportster Vi 28.8 DSVD	The next level in multitasking—send files and talk across a single phone line with the first DSVD modem.	\$300, DSVD, V.34 (28.8Kbps), Intel ProShare Premier Edition.	See this issue, page 75. Reader Service No. 690

PC COMPUTING

# The A-List Editors' Top Picks by Wendy Taylor

		Top Pick	The Buzz	The Stats	Issue Reviewed
Desktop Applications	Software Suite	Microsoft Office for Windows 95	An excellent (and so far the only) software suite for Windows 95, Are you listening, Lotus and Novell?	\$499 (Standard Edition) Windows 95, 28MB to B9MB hard disk space.	See this issue,
	Word Processor	Microsoft Word for Windows 95	The wordsmith's favorite app moves to Windows 95, Ami Pro fans: Look for a 32-bit Lotus Word Pro this fall.	\$339, Windows 95 or Windows NT 3.51, 8MB RAM.	See this issue, page 83. Reader Service No. 692
	Spreadsheet	Microsoft Excel for Windows 95	While Quattro Pro and Lotus 1-2-3 languish in the 16-bit world, Excel steals the 32-bit show.	\$339, Windows 95 or Windows NT 3.51, BMB RAM.	See this issue, page 83. Reader Service No. 693
	Database	Lotus Approach 3.0	Microsoft's Access for Windows 95 is just around the corner—but Approach is still the usability champ.	\$105, 386 or faster, 4MB RAM, B.5MB hard disk space.	See March 1995, page 146. Reader Service No. 694
	Presentation Graphics	Lotus Freelance Graphics for Windows 95	The premier presentation package— and reason alone to make the Windows 95 upgrade.	Price not available, Windows 95, 1BMB to 40MB hard disk space.	See this issue, page 94. Reader Service No. 695
	Personal Desktop Publisher	Microsoft Publisher 2.0	The people's press and the usability champ. We can't wait for the Windows 95 version.	\$99, 3B6 or faster, 4MB RAM, 3MB hard disk space.	See July 1995, page 170. Reader Service No. 696
Graphics	Professional Desktop Publisher	QuarkXPress 3.3 for Windows	The ultimate in industrial-strength page layout—but PageMaker shops should check out the Windows 95 version.	\$570, 386 or faster, 8MB RAM, 12MB to 15MB hard disk space.	See December 1994, page 163. Reader Service No. 697
	Business Graphics	Visio 95	The drag-and-drop drawing program for left brainers gains do-it-for-me Wizards under Windows 95.	\$149, BMB RAM (Windows 95) or 4MB RAM (Windows 3.1).	Stay tuned. Reader Service No. 698
	Photo Editor	Adobe Photoshop 3.0 for Windows	A digital darkroom for your PC. But a Windows 95 version isn't expected until early next year.	\$550, 486 or faster, 8MB RAM, minimum 20MB hard disk space.	November 1994, page 106, Reader Service No. 699
Finance	Personal Finance	Intuit Quicken Deluxe 4	Take back your checkbook. Get your finances under control quickly and painlessly.	\$69, 386 or faster, 4MB RAM, 7M8 hard disk space.	See April 1995, page 186. Reader Service No. 700
ı <u>F</u>	Business Accounting	Peachtree Accounting 3.0 for Windows	The least offensive CPA we've ever met.	\$139, 3B6 or faster, 4MB RAM, 12MB hard disk space.	See October 1994, page 88. Reader Service No. 701
Constructions		Delrina Communications Suite 2.1	Total fax and modem control. Get it with a personal page scanner and send hard copy, too.	\$115 (\$299 with page scanner), 486 or faster, 4MB RAM.	See January 1995, page 126. Reader Service No. 702
		Netscape Navigator	Still the best way to explore the World Wide Web. Download a copy from ftp.mcom.com.	Free (\$39 commercial), 4MB RAM, Internet access.	See April 1995, page 52 Reader Service No. 703
Organization Tools	Personal Information Manager	Lotus Organizer 2.0	So the interface is a little precious— the networking and usability extras are first-rate.	\$99; 386 or faster, Windows 3.1, 8MB hard disk space.	See February 1995, page 118. Reader Service No. 704
	Project Manager	Primavera Systems SureTrak Project Manager	Manage a cast of thousands for less than a king's ransom.	\$299, 3B6 or faster, Windows 3.1, 4MB RAM, 11MB hard disk space.	
	System Utility	Microsoft Plus for Windows 95	All the goodies Microsoft left out of Windows 95—Web browser included.	\$50, 486 or faster, Windows 95, 25MB to 40M8 hard disk space.	See this issue, page 88. Reader Service No. 706
	File Utility	Nico Mak Computing WinZip for Windows 95	Slash your online time and reclaim your hard drive; zip your file uploads and squeeze data files down to size.	\$29, Windows 95, Windows 3.1 version also available.	Stay tuned, Reader Service No. 707

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And now it's here. The most powerful PC operating system known to man and mouse.

But before you settle down to work in the 32-bit world of Windows 95, there are a few things you should know.

### INFECTION PREVENTION IN THE NEW WORLO.



And on the networked, file-sharing superhighway of life, the chances that your PC will be exposed to

a virus are far greater than you might think.

And guess what? Your old antivirus software won't work in the brave new world of

Windows 95. But thousands of old viruses will.

Which is why you should install Norton AntiVirus\* for Windows 95 from day one.

Norton AntiVirus is verified to protect you from 100% of all viruses known to be in circulation.

Norton AntiVirus for Windows 95 protects you from virus attacks. But you need more than just protection from a long list of known viruses. Which is all that ordinary anti-virus packages can offer.

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virus activity
in your
system and
eradicates
it before
it can do

any serious

AntiVirus spots

#### A 32-BIT OPERATING SYSTEM DEMANDS 32-BIT PROTECTION.

Another thing you may not know is that your old 16-bit utilities won't work in Windows 95.

> Work faster and mor productively with Norton Navigato for Windows 9

15

# PREVENTION, PROTECTION WINDOWS 95

damage.

So even if you encounter a virus that was just created yesterday by some hacker with a bad frozen pizza habit, Norton AntiVirus will

And when
could you possibly
need protection
from unknown
viruses more
than in a brandnew operating
system?

And the utiliries included in Windows 95 itself won't give you much protection in a 32-bit world.

Only native 32-bit utilities can give you adequate system protection in a 32-bit environment.

Which is why you need to upgrade your utilities to Norton Utilities\* for Windows 95.

The first thing Norton Utilities will do for you is optimize your system for Windows 95 with a Pre-installation Tune-up.

Then Norton Utilities runs continuously in the background, monitoring your system and automatically launching the right tools to maintain system performance and prevent system crashes.

or redigenders erm conducted by NCMs and SOUM, July 1995. The control of the Cont

And if something does go wrong, Norton Utilities gives you the data recovery tools users have relied on from day one.

So from the day you install Windows 95, your system is stable and your files are protected.

#### THE MORE WORK YOU DO, THE MORE WORK NORTON NAVIGATOR WILL DO FOR YOU.

Windows 95 has lots of terrific features to make life easier. Like Plug 'N Play. And long file names. lorton Utilisies keeps our data safe from harm.

You can plug into your Internet connection right from the Norton File

Manager. Search for text strings within files at least ten times faster. (In fact, the more files you have and the bigger they are, the more time you'll save.)

And copy a file anywhere on your hard drive or on the network with just one click. Instead of click

> click click click click click click (are you tired of clicking?)

click click. Which is generally how long it takes to copy a file in Windows 95.

Norton Navigator also lets you use long file names for most

applications.

you loads of other time-saving tools like built-in PK-Zip compatible file compression and the ability of delete, move, zip or encrypt from any Open or Save dialogs box.

Norton Folder Navigator

So why waste time wading up and down menus, clicking your life away? Every minute counts.

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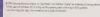
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# GUESS AGAIN



'm trying out this brand-new, operating system upgrade, and it makes Windows 3.1 look like a bad joke. The upgrade is elegant and seamless, with tons of advanced features and a truly intuitive interface. It's far easier to use than that 3.1 mess with its eight-character filenames, quirky INI files, squirrelly hardware configuration, and the terrible trio of File Manager, Program Manager, and Task Manager.

Check out the many benefits the upgrade offers: SMART INTERACTIVE HELP walks you through complex tasks step-by-step; highlights the items you need to deal with; and is systemwide, so any application can exploit it. It's as close to foolproof as it gets, and is especially terrific for

nontechnical users.

SLICK FILE AND FOLDER MANAGEMENT is intuitive and truly easy to learn. Icons are all consistent. Long filenames up to 31 characters are a breeze to use, and this operating system handles them deftly in tricky situations like renaming them or copying them to floppies.

REAL PLUG AND PLAY means you never again have to enter arcane information about IRQs and memory-mapped addresses. And since it handles both new and old hardware without a hitch, hundreds of millions of dollars of investments in ancient hardware are safe.

HIGH-PERFORMANCE, BUILT-IN MULTIMEDIA SUPPORT is finally here. With hardware issues nailed down, and just about every kind of video player, 16-bit stereo audio, video capture and compression, and even 3-D, videoconferencing, and VR already built in, all multimedia software works flawlessly right out of the box.

EASY, BUILT-IN NETWORKING means that multiple users can simply plug in and be instantly

connected to each other—even without a server. Built-in software makes it a snap to exchange files and mail. Logging on to any server is now quick and consistent. And a TCP/IP client is here as well, for easy Internet access,

BULLETPROOF INSTALLATION is truly onebutton simple. It's intelligent and automatic. And because the code is freely licensed to developers, apps are simple to install, too.

TRUE 32-BITNESS of course means fewer memory problems, especially with older software versions. The system can really take advantage of gobs of RAM, and overall performance is greatly increased.

Yup, those GUYS FROM APPLE have done it again. Macintosh System 7.5.2 is by far the easiest, smoothest, most usable operating system out there. Oh sure, that new Windows 95 upgrade from Microsoft isn't bad either, considering it "borrowed" a whole lot from the Macintosh interface, and its multithreaded, preemptive multitasking is a plus. But with the rearchitected Copland OS just around the corner, with its dramatically improved ease of use, customization, and active assistance, Apple should once again widen its operatingsystem usability lead. Too bad Windows always has to be a step or two behind.



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The stock almost doubled, and after a few days the IBM-Lotus deal was done. But \$3 billion just doesn't buy what it used to: a fading spreadsheet, a word processor that's not a contender, and a groupware product many people hate. Louis Gerstner, IBM's chairman and CEO, publicly stated that the purchase had nothing to do

with OS/2. It was sweet of him to say that. First of all, I believe it was disingentuous to say the deal had nothing to do with IBM's OS/2 strategy. That's only partly true. I believe OS/2 is part of a larger scheme so grand it actually compares to something Microsoft might have done.

What is IBM really getting here—and is it worth \$3 billion? What it's buying is a second chance. Remember, this is the company that once had virtually 100 percent market share of the PC business before it fumbled big-time. But now the company is gearing up to recoup its losses. IBM is about to roll out the PowerPC machines, but it needs applications. That's where Lotus comes in. If its software is ported to the PowerPC platform and optimized for PowerPC performance, users won't need Microsoft at all. Lotus 1-2-3 on the PowerPC will be just fine, thank you. And Lotus's Ami Pro (now Word Pro) has been the connoisseur's choice in word processing for a while.

The PowerPC computers have been terribly delayed waiting for an operating system. Now we all know that Windows NT is up and running for the PowerPC, so why not just use Windows NT? Obviously, the IBM-Microsoft feud is more serious than it appears. In fact, when the next-generation machine finally does show up, it will use OS/2 as well as some aspect of Taligent (whatever that turns out to be), and run Lotus applications. IBM will not be painted into a corner by Microsoft ever again. And as it views the situation at Apple, IBM sees that when Microsoft has even the slightest edge, it will throw its weight around as much as possible.

But IEM also has to be aware of the power Microsoft has to cloud users' minds, and of the failure of Next's computer line and every proprietary low-end system that opped to leave Microsoft out of the formula. Here's where IBM may be banking on Lours to prevent that kind of disaster. After all, applications such as Notes will be the same on the PowerPC as they are on the Intel/Windows-based

Firing up a

software

aren't big

is all this

What's the

EXIT strategy?

SCORCHED-EARTH

company with

PRODUCTS that

CONTENDERS....

WORTH \$3 BILLION?

systems. Also, Lotus won't abandon the Windows environment or Intel processors. At least, not right away. And this is also where OS/2 comes in.

Gerstner is a marketing man, and he is sorely aware of recent IBM marketing fiascoes, including those idiotic airport posters about OS/2 Warp that announced, "It Obliterates All the Software on My Computer," which made it sound like Warp screwed up the machine. In fact, most of the software marketing at IBM has been horrendous. While Lotus has botched Magellan, Improv, and other products for all sorts of reasons, it is still

head and shoulders above IBM in software marketing. When Lotus focuses on something, it moves a lot of copies. Teaming up Lotus with Gerstner's top people could create a marketing dynamo that's outside the normal chain of command, not restricted by the usual IBM bureaucrats. This may be Gerstner's way of destroying IBM deadwood: Buy outside companies and then mold them the way he wants.

OS/2 and all of the IBM software offerings will be handed right over to Lotus, and Lotus will be told to make itself into a Microsoft in every way—tful-service, scorched-earth software company. I suspect that IBM's Personal Software Products (PSP) group—the folks who "obliterated" your computer—will themselves bite the dust.

Then again, it's quite possible that Lotus won't cut it. Maybe the company is already in over its head, hence the past fumbles and sometimes mediocre performance. Maybe IBM won't be able to make the transition, or perhaps Lotus's applications will never run on the PowerPC.

or under OS/2 adequately. Will that \$3 billion go down the drain?

All plans have an exit strategy. If IBM front-loads Lotus with all its own cool software, including OS/2 and everything else it can find, it should be able to sell off this "new" software company to the public or to a group of investors in much the same way it did with peripherals and Lexmark. In that case, it would maintain a 10 to 20 percent equity position for future benefit and product support. In fact, this may even be IBM's primary strategy: Build up a big software company, stuff it with money drains such as

OS/2, and sell it back for what you paid while keeping some equity. Meanwhile, you've gone in there and instilled some Big Blue stooges to make sure the company supports IBM while exploiting non-pany supports IBM sales and marketing capabilities.

It looks like an interesting year ahead.

# zeos Pantera Strikes Again!

#### **Keeping You In Front**

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# FLEXIBILITY

The varied demands of today's mar-

ketplace require small businesses to perform an increasing variety of functions.



Whether it's in sales or finance, really or result, flexibility is the new key to long-term success. In three days of doing more with less, the way in which companies allocate resources has changed. In the past, financial clour often determined who came out on top. Today, faced with competitive and market pressures.

Today, faced with competitive and market pressures.

Flexibility and a sense of adventure must be a past of any company's corporate culture if it is to succeed into the 21st century.

Lurge companies, of course a greater challenge than small busing generally have an easier time implemencies. But no matter what the size of companies with an adaptable structure outlook are better positioned to capture to than their competitors; their ability to quest, or even redefine, their business of sures their continued success.

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e at the corporation have laptops, don't worry. We are networked up the proverbial wazoo. We are registered, big-time, for all kinds of multiuser functions in all key applications. We have, I should mention, a boardroom that could pass, in a pinch, for the bridge of the Starship Enterprise, whose mission was to seek out new life-

forms. So why are we still using overhead acetates for all major presentations? Are we stupid? Are we archaic? Are we hopelessly mired in the past? Not at all.

We only cling to the old and precybernetic solutions because you can dress up a bunch of piglets in three-piece suits and give then expense accounts and business cards, but that doesn't make them good senior managers. And they'll probably reverto smilling ruffles if you give them half a chance. Likewise, you can spread all the computer technology around that you want to, but that doesn't mean people will use it wisely, or at all.

That's because progress is hard. In the real world, where the stakes are high and people are often brittle and unforgiving, it's difficult to saddle up, take hold, and ride a new horse to the finish line. And did I mention that progress is expensive, too?

Is it worth doing? You be the judge.

A call came in last week from Tammy in Baltimore. "I've got 15 charts for the presentation on the 19th," she said. "Do I have top rint overheads or can we do it like, you know, a proper presentation?" I took this as a challenge. For years, efforts have been made to convince our culture, or any representative of it, to convey information in colorful, bold, digital format. A huge yawn, tinged with some anxiety, has been the generic response. This time we had a chance to do it differently. I immediately called Larry, who runs office services.

"Now's the time to crank up the onboard computer in the boardroom," I said.

"You mean the box that's supposed to turn computer images into a television signal? It isn't really working," said Larry. "What do you mean by 'isn't really working,' Larry?"

"I mean it isn't working at all."

"So we can't run Tammy's presentation through the computer? Then what do we have that computer for?"

"We have it so that we can run presentations through it," said Larry, with implacable logic. I let it lie. Larry hadn't built the offending piece of hardware.

bas more bells

and whistles.

GEWGAWS and

doodads than

an attack-class

NUCLEAR

submarine.

So WHY AREN'T

WE using any

of them?

"Can we run Tammy's presentation through her laptop?" I inquired.

"We need a machine like the one they have in sales," said Larry, perking up considerably. "Will you sign a purchase order for one?"

"Sure!" I said. Hey, It's only money, Besides, we were blasting into entirely new territory here. The machine was a Proxima Ovation. We paid less than \$10,000, but not much less. As far as I'm concerned, the money spent on the original equipment was far more bothersome. At least this Ovation thing works. You plug in a color laptop, and it projects a very nice image across an enormous room

and onto a waiting screen. The colors aren't as fabulous as on a dedicated monitor, but it didn't take an IBM marketing specialist to tell me we were in business.

Larry tried to rig up a remote mouse to run the presentation, but the object he came up with was so bizarre as to be unusable. About three feet long with a red laser light on one end, it looked like a cross between a riding crop and a proctological implement. Thank goodness we couldn't figure out how to install it.

The day dawned bright and clear. It didn't matter, of course, since we were 35 floors up, behind hermetically sealed glass. Collected around the enormous walnut table were 30 top executives. The lights went down and the Ovation, which had been calibrated for a medium-lit room, began to beep intermittently.

"Sales were up 3 percent in the second quarter, resulting in year-end projections that look something like this," said Tammy, smoothly rolling through chart after chart.

"Beep beep beep," said the Ovation.
"Let me move up to the front of the

The BOARDROOM

The BOARDROOM

The BOARDROOM

The BOARDROOM

Yet Tammy plugged on. Yes, the spreadsheets would have to be rethought in the future, climinating and paring down all but the most important entries. Yes, bolder colors would be necessary if the drama was to be sustained. But all in all? It worked. And things will never be the same.

"Make me one like that for next month," said the vice president of human resources as he passed from the room.

"Cool gizmo," said the vice president of finance, who had just previously been appalled by the Ovation's price tag. And now? We have

nowhere to go but up. Who knows? With the right investment of time and money, maybe we can even make the original equipment work—still the best, most elegant solution. Even if we can't, though, we're way ahead.

Those who can't trade up from the past are condemned to repeat it.

TOGRAPH BY JAMES McGOON



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# l ew!

## Windows 95: Just in Time

Windows 95 is harder to pin down than an incumbent politi-

PREVIEW incumbent politician in an election year. Is it an all-new 32-bit operating system? Umm, not exactly. Is it a thorough upgrade to Windows 3.1? Yes, but it's more than that. Is it a stepping-stone on the road to Windows NT? For some businesses, absoluted.

Judging by the publicity, you'd think that Windows 95 has something for everybody—and you'd be right. Microsoft's new operating system was designed with the explicit goal of appealing to the largest number of users and the broadest imaginable range of hardware-rank novices with 48ks, corporate roadies with souped-up ThinkPads, and power users with band-cafted Pentiums.

If you and your organization have standarficed on Windows 3.1, you'll want to upgrade to Windows 95 as soon as possible. The benefits of Plug and Play and the vastly improved networking and multimedia support are seductive, but it's the improvements in system resource handling that make this upgrade irresistible.

If, on the other hand, you're searching for a crashproof, secure, robust, fully 32-bit operating system, keep looking. This is not NT Lite.

For this review, we looked at the first of several "release candidates" distributed by Microsoft a few weeks before the actual manufacturing was scheduled to begin. We did encounter a few minor bugs, although none of them was serious enough to cause us to lose data. The code we looked at included all the interface elements and features expected to be in the final release, which is scheduled to ship August 24.

Out-of-Box Experience We installed Windows 95 on six test machines, ranging from 33MHz 486s to 90MHz Pentiums with newly formatted hard disks and overcluttered Windows 3.1 desktops. The upgrade release, which requires a previous version of Windows or OS/2, comes on 14 floppy disks or a single CD-ROM and should self for about \$100. The \$209 package for new installations comes on floppies only.

If you have a choice, we highly recommend the CD

version, which includes a hand-ful of extra utilities (such as the Quick View file browser and the Character Map), support for multiple languages, a collection of multimedia clips and sounds, and a distinctly un-Doom-like 3-D game called Hower. The real star of the CD, though, is the Windows 95 Resource Kit, formatted as a fully indexed and scarchable Help file. (See Resource Kit excerpts beginning on page 358s.)

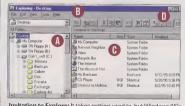
After putting Windows 95 through its paces on our test systems, we installed Microsoft Plus for Windows 95 (see "What Microsoft Left Out of Windows 95," page 88), a \$50 add-on package targeted at 486

and Pentium-class PCs that includes Internet access utilities, enhanced DriveSpace diskcompression drivers, and coordinated look-and-feel schemes that replace the default wallpaper, icons, mouse pointers, and system sounds.

Wizards Everywhere Run the Windows 95 Setup program and you get an instant illustration of Microsoft's obsession with usability. There are Wizards and extended information screens at every step of the process, and unless you choose the Custom setup option, you'll never see a conventional dialog box.

Plug-and-Play detection was quite impressive on all our test

#### **OVERVIEW** The Windows 95 Interface



Invitation to Explore: It takes getting used to, but Windows 95's Explorer assumes the lead in file management over Macintosh and OS/2. Explorer uses a different metaphor from File Manager, however, so it does require some retraining. Customizing toolbars and menus can be tricky, as well.

Status Indicators: Click in the notification area on

Status Indicators: Click in the notification area on the Taskbar for instant access to system services. A. The Tree pane shows everything in the local computer or on the network. The universal browser handles more than just files—it also does Control Panels, fonts, printers, drives, and more. Outline controls are everywhere, including mini apps like Exchange and Microsoft Network.

B. Toolbars and menus are consistent throughout Explorer, but they can't be customized

C. Long filenames, hidden extensions, and pop-up property sheets make it easier to figure out what's behind each icon.

D. Take your choice of four views. This Details view is almost like the old Windows File Manager. Too bad you can't see the exact file sizes or rearrange the information that's displayed.

#### **Guide to PC Computing's Ratings**

Poor Out-of-date or substandard, offset by some positive features.....\*\*

#### **GUIDED TOUR**

IT'S STILL NOT CRASHPROOF



Retrain Your Fingers: Ctrl-Alt-Del pops up this helpful dialog box that lets you see every running app (even background system tasks) and kill one that's misbehaving.



Isolate the Problem: What happens when one of the Windows applications stops responding? With Windows 3.x, it's time to hit the big red switch. Under Windows 95, you can terminate the offending application and get back to work.



Protects Against Faults: With Windows 3.x, you needed the Dr.c Watson utility to diagnose the exact cause of a general protection fault. The Details button on the Windows 95 GPF dialog box offers troubleshooting information.

systems, but it wasn't quite perfect. Windows 95 detected every hard disk, SCSI controller, network card, and sound card we threw at it. It got most video cards right, too. although on one system with an older STB Pegasus video card it incorrectly installed a generic S3 video driver. The resulting scrambled video display forced us to go through a brief tour of Windows 95's troubleshooting Safe Mode-a generic startup option that lets you change or remove troublesome drivers. We also had to manually enable PC Card support (Windows 95 loaded the drivers but it failed to activate them) when installing onto a Toshiba notebook with a freshly formatted hard disk. With the exception of those glitches, setup went smoothly on every system.

The CD-ROM version of Windows 95 also provides an impressive demonstration of the new AutoPlay capability for installed Windows 95, inserting the same CD promts it to play automatically, giving you the option to start a game of Hover, search through video clips, preview other Microsoft products, or browse the CD using the Windows Explorer.

CDs. Once you've successfully

New Look During the setup, our Program Manager groups migrated to the Start menu, which pops up when you click on the Start button in the lower-left corner of the screen. An informal survey of editors and beat testers turned up mixed reactions to the new cascading menus. Some users were thrilled with the instant accessibility of the Start menu; others complained that the cascading menus require too many clicks to get a simple task done.

The rest of the interface inspired a similar mix of reviews from testers. Features that were generally well liked include right-mouse-button shortcut

sensitive options for the selected object. Unique menu choices for a CD-ROM icon. for example, include play and eiect, while a formatted Word file would include options to delete or view the file. The Taskbar along the bottom of the screen, which lets you shuttle among running apps with a single click, also earned high marks. Other welcome interface improvements: tabbed Properties sheets for every object, new common dialogs, and ubiquitous shortcuts, which serve as pointers to data and program files elsewhere on a disk or across a network.

menus, which pop up context-

The jury is still out on long filemanes. They're a blessing when used with Windows 95 applications, but the automatically generated eight-dot-three short filenames cause compatibility headaches when used across networks or with existing 16-bit Windows amblications.

There are usability gotchas lutking in the manner in which Windows 95 handles file extensions, too: Those pesky threeletter extensions are still used to track associations between files and applications, but because the operating system hidse them by default, experienced users might find it difficult to change the extension (and therefore the association) for an existing file.

Resource Gauge The most frustrating limitation of Windows 3.x is its cramped system resource heap. These three 64K storage areas for icons, windows, menus, and other system objects put a serious dent in productivity, as any longtime Windows user knows. Ultimately, it affects performance as well, because system resource limits prevent users from running multiple applications and taking advantage of sexy features like object linking and embedding (OLE).

## New! SNEAK PREVIEW: Windows 95

They also necessitate frequent reboots when poorly written applications fail to release system resources.

Windows 95 cures those ills in dramatic fashion. Most (but not all) of the objects in the system resource area are now stored in virtually unlimited 32-bit heaps, and the operating system tracks system resource use so that it can clear the resource heap of unneeded entries after an application quits.

Windows 95 is faster than Windows 3.x on simple jobs and in demanding multitasking environments. It also recovers gracefully from application

faults. Unfortunately, it's still too easy to crash the system.

Unlimited Resources For a practical demonstration of the resource improvements in Windows 95, just start doubleclicking on programs and folders. We predict your index finger will give up before Windows 95 does. On a 90MHz Pentium with 16MB of RAM we were able to open more windows than even an obsessive-compulsive user would want to deal with: We opened all four Microsoft Office apps, Lotus Notes, the Exchange mail client, a beta ver-

sion of the new Schedule Plus

every applet in the Accessories folder, a dial-up connection to the Internet, five Netscape windows. our favorite PIM, and 34

Explorer windows.

With more than 50 windows open, performance didn't skip a beat, and we still had 27 percent free system resources—enough to open 50 more windows. When we closed all those windows, free resources shot back up to 85 percent, a bit less than the 96 percent we started with because certain system services, once loaded, sat loaded.

Performance Windows 95 feels faster than its predecessor in most operations, and informal benchmarking bears out those results. Give credit to more intelligent caching and swap files, both of which work dynamically instead of requiring you to twiddle with virtual memory settings. The new 32-bit CD-ROM, network, and floppy drivers go nicely with the 32-bit hard-tisk drivers that first appeared in Windows for Workeroups 3.11.

Extra memory helps, too. Microsoft says that if you're happy with the performance of Windows 3.1 using 4MB of RAM, you'll find Windows 95 tolerable under the same cramped conditions. We aren't, so we can't recommend this minimal configuration.

On a 33MHz 486 with 8MB of memory, Windows 95 runs acceptably, although it slows greatly when you combine DriveSpace compression and memory-hungry apps like those in Microsoft Office or the Exchange mail client.

For a real-world measure of multitasking prowess, we tried the benchmark made famous in countless OS/2 demos: formatting a floppy disk while downloading a data file in the background. First we established a 28.8Kbps dial-up session to an Internet service provider, then we started a Windows FTP session to retrieve 30MB of files from a distant server. At that point we began formatting a stack of floppy disks. The disk formatting took about 25 percent longer than normal, but the FTP session chugged along at full speed. In fact, we were able to work on a Word document in another session, play a video clip, and open other windows without significantly affecting the performance of either background task.

That's not to say that Windows 95's multitasking is perfect. With 16-bit Windows applications—like WinCIM 1.4 in particular—we were able to grind the system to a near

#### GUIDED TOUR

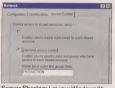
NETWORK AND INTERNET CONNECTIONS



**Tightly Coupled:** The 32-bit NetWare client from Microsoft attaches seamlessly to NetWare 3.*x* servers, processes log-in scripts, and talks to Novell print queues.



Dial-Up Networking: When you try to access a shared resource from a notebook, Windows 95 offers to hook you up via a remote connection.



Server Sharing: Let your Windows 95 workstation masquerade as a real file and print server. Use any NetWare server to "pass through" trustee rights.



easy NetWare connections, or built-in TCP/IP for instant Internet access.

halt because of architectural compromises in the way the 16-bit window-management system communicates with older Windows apps.

Fault Recovery Windows 95 doesn't offer the memory protection of Windows NT. A determined hacker with a copy of Debug can demonstrate this with a few commands in a Windows 95 DOS box. Because even 32-bit Windows applications share some memory space, it's possible for a buggy virtual-device driver or a poorly coded application to lock up the system completely. In extreme cases, you'll see a stark white error message on a dreaded blue screen, signaling that Windows has stopped responding all together.

The good news? Windows 95 can recover from a wide range of errors and protection faults. In many cases, we were able to save data in other running programs even after bluescreen errors. Windows 95 improves on Windows 3.1's crashproofing by trapping the Ctrl-Alt-Del key sequence. Instead of rebooting, this threefingered salute invokes a Close Program dialog box from which you can quickly kill a hung application.

Bottom line: Windows 95 is much more robust than Windows 3.1, but it's still not acceptable for mission-critical applications. If you can't afford downtime or lost dataever-vou'll want to look for a higher-powered operating system like Windows NT or Unix.

Compatibility Question There are already several hundred Plug-and-Play systems and peripherals to choose from, including sound cards, SCSI adapters, CD-ROMs, networkinterface cards, printers, and more. An all-Plug-and-Play system is a relief to configure, but you won't need to upgrade all those old machines to see a payoff from Plug and Play.

#### **GUIDED TOUR**

#### MANY WAYS TO PLUG AND PLAY



Hardware Made Easier: Right-click on the My Computer icon, choose Properties, and you get an instant window on every hardware setting inside your system.

A. Outline-style controls are common throughout Windows 95. Once you've used the Windows Explorer, you'll already know how this dialog works

B. Each system device gets its own entry here. If there's a problem, you'll see a vellow exclamation noint over the entry. A red X means the device has been disabled

C. Click on the Properties button for details on the selected item everything from IRQ and DMA assignments to driver and configuration details. If there's a resource conflict, the Properties dialog box will suggest troubleshooting options.

D. Notebook users can set up alternate Hardware Profiles to handle docking stations without headaches.

E. Click on the Performance button to verify that all aspects of Windows 95 32-bit drivers, Buttons here also let you cure compatibility video and file system options.

Plug-in Peripherals: Plug and Play and PC Cards were made for each other. Each time you insert a new device, Windows automatically installs drivers for it. If there are no built-in drivers, you can substitute a compatible driver from the 1,600 or so choices.



Windows 95 has built-in drivers for 1,600 so-called legacy devices-ISA cards, modems, printers, and the like. That estimate actually understates the number of devices supported by Windows 95, because offbrand peripherals that are compatible with industrystandard devices like NE 2000 network cards or Sound Blaster cards will be detected and correctly configured.

Microsoft's lofty goal of maintaining compatibility with nearly all existing Windows and DOS applications has fallen a bit short. Reportedly, there are somewhere around 200 applications that

won't run correctly under Windows 95, Some of them are obvious, like disk utilities that attempt to directly manipulate the file allocation table (FAT). But others, like font-management utilities, will cause headaches in organizations that have grown to rely on them. You can count on successfully running mainstream business applications such as WordPerfect and PageMaker, but if you have a more obscure application on your must-have

list, check with Microsoft Net Results Compatibility isn't a problem with Net-Ware. In fact, Windows 95 is

before installing it.

so tightly integrated with Novell's market-leading network operating system that you'd swear they were part of the same operating system. The 32-bit NetWare client uses no conventional memory, and it offers seamless attachments to NetWare servers—as long as they're running NetWare 3.x, that is. The client software for NetWare 4 r won't arrive until a few months after the shrinkwrapped Windows 95 boxes.

Naturally, Windows 95 also supports other high-end networking platforms, including Windows NT and Banyan Vines. If you're interested in peer-to-peer networking-

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MAGNAVOX Smart. Very smart. sharing printers and files with other clients on the same LAN—Windows 95 lets you choose peer services for Windows or Net Ware

No matter which networking platform you choos, it's far easier to browse the network thanks to the Network Neighborhood. This window, directly accessible from an icon on the desktop, lets you connect to all types of servers and browse for files or shared resources without worrying about attachments, log-in scripts, drive mapping, or print queues.

And even if you're not physically attached to the network, Dial-Up Networking lets you tap into shared resources over a modem connection. The dial-up elient is built in to every copy of Windows 95. The server component is in the Microsoft Plus package, although you can also connect to an NT server or a NetWare remote connection.

Conventional wisdom says network administrators will shy away from Windows 95, at least until the first diskfull of bug fixes and patches is available. But that strategy might be a mistake. There are plenty of enticing features tallor-made for network mavens, from remote software installation to a policy editor that lets information-systems types standardize user desktops and disable potentially dangerous features.

What Else? With nearly 60MB of code in the base operating system, there's no shortage of features in Windows 95. We haven't even mentioned Microsoft Network, the Exchange e-mail-fax client, the Recycle Bin, or integrated DriveSpace disk compression. You'll have to discover the vastly improved games support and print spooling on your own. And we'll leave it to you to be surprised by the power and ease of use of Windows 95's multimedia drivers and tools.

#### **GUIDED TOUR**

CONFIGURATION AND TROUBLESHOOTING



Don't Just Read About It: The Windows 95 Help system includes buttons that give you the option of jumping straight to the appropriate Control Panel applet or dialog box.



New Printer? The Add Printer Wizard walks you through the setup process. Choose a network printer from the list to automatically copy drivers to a local PC.

2 Windows Help Help Topics PC Card (PCMCIA) Troubleshooter This troubleshooter helps you identify and solve problems with your PC cards (A PC card is also called a PCMCIA card ) Just click to answer the questions, and then try the suggested steps to fix the problem. What's wrong? Mv PC cards aren't installed automatically when I insert them My PC card was installed, but it doesn't work properly Some of my PC card slots cannot read memory cards.

Walk-Through Help: New Q&Astyle troubleshooting sections pose relevant situations to help pinpoint problems and solutions.



If It's out There... The Find All Files or Folders utility lets you search for objects using any combination of information, including filename, date, and contents.

We can point to a few missing pieces that we wish Microsoft had added to this version of Windows—a batch language is sorely needed, but you'll have to make do with a single new MS-DOS batch command that lets you launch Windows apps from a command line. The backup utility doesn't do SCIs, nor is there a built-in antivirus utility, so figure on spending a few dollars more if you just can't do without those products.

Another flaw is Windows 95's continued reliance on the FAT system, which recklessly disregards hard-disk efficiency. On today's gigabyte-and-larger hard drives, a single Windows shortcut (merely 300 bytes) occupies 32K of disk space. The result is hundreds of megabytes of wasted space, and the only way to reclaim it under Windows 95 is to partition a drive into several small volumes, or to use enhanced DriveSpace 3 compression from Microsoft Plus.

Those are mere quibbles, though. For most users, this is a superb upgrade to Windows 3.x. In homes and on average business desktops it will be the mainstream operating system for years to come. ED BOTT

#### FILEBO)

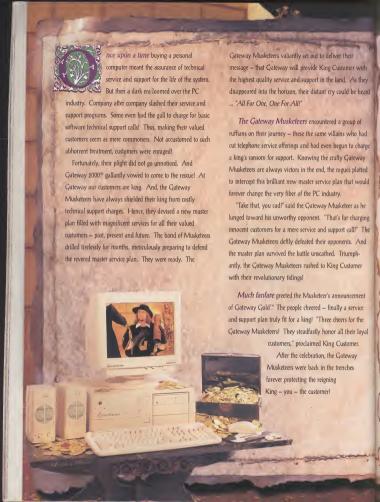
#### Windows 95 Usability

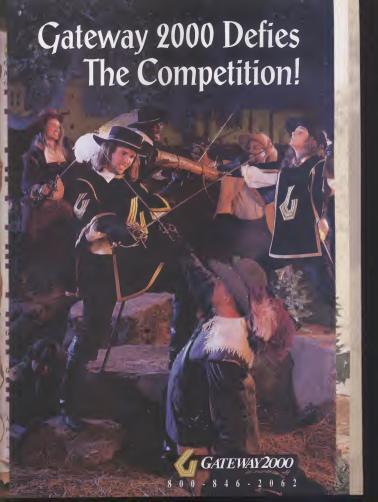
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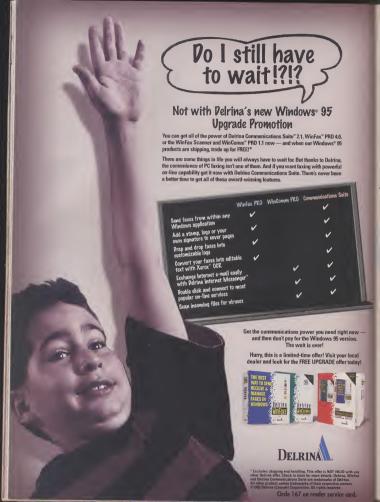
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#### Sportster Vi 28.8 DSVD

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teamwork is central to your business PREVIEW success. But what if vour team members are split between, say, Cleveland and San Francisco? Your communications options-commuting. video-teleconferencing, overnight deliveries, or e-mail, for example—all have their benefits and drawbacks. But few let you share an application and carry on a conversation simultaneously, and none lets you do so over a single analog line for as little as \$300-except, that is, U.S. Robotics' new Sportster Vi 28.8 with Digital Simultaneous Voice and Data (DSVD).

Just Add Voice The Sportser Vis a 28.8Kbps internal fax modem that installs like any other modem card. The Sportser has two standard RJ11 jacks (one for the phone and one for the fax modem), and two I/O jacks (one for a microphone and one for a speaker). But unlike other modem cards, the Sportster Vis the first to integrate DSVD technology.

DSVD lets modems send both voice and data over an analog pione line at the same time. DSVD is a jointly developed open standard from U.S. Robotics, Intel, and Rockwell Network Systems, as well as other major players in the modem-producing community.

What's the best way to leverage the power of DSVD? For starters, the Sportster Vi includes Intel's ProShare Premier Edition 1.6. ProShare is advanced personal-conferencing software that includes a conferencing whiteboard and application sharing. With



Look Who's Talking: U.S. Robotics' Sportster Vi 28.8 DSVD lets you carry on a conversation and transfer data at the same time—across one analog phone line.



ProShare Premier Edition, which lets you simultaneously share applications, edit files, and annotate documents on a shared whiteboard.

ProShare, for example, you and your colleagues can jointly edit a sales presentation in Word or Excel (or any other OLE-based application) while discussing the changes. On the lighter side, many computer games are now programmed to be played via modem, and Sportster Vi 28.8 includes Descent, a 3-D flight-combat game.

not perfect. Since it digitizes and compresses audio as well as digital data, we experienced a rather noticeable reduction in audio volume during data transfer. Also, DSVD is currently designed for single, point-to-point conversations; at press time, multiple-party conferencing was not yet available.

Drawbacks DSVD is

#### FILEBOX

#### Sportster Vi 28.8 DSVn

Usability \*\*\*\*\*
Technology \*\*\*\*\*
Verdict \*\*\*\*
Great solution for talking and trading data simultaneously.

Competition: The Sportster VI 28.8 DSVD is the first modern on the market to incorporate the open DSVD standard. Watch for other DSVD products from Intel, Creative Labs, Hayes, and Rockwell Network Systems in the near future. DSVD is an alternative to Radish Communications' VoiceView (see "The VoiceView (see "The

Features as Tested: V.34 fax modem with DSVD capabilities includes Intel's ProShare Premier Edition personal conferencing software.

August, page 202).

Data Compatibility: The Sportster Vi 28.8 DSVD supports V.34 with V.FC and V.32bis. Data-transfer speed goes up to 28.8Kbps; fax speed goes up to 14.4Kbps. 5300 est. street price U.S. Robotics (800) 38.2-59.77 Reader Service Via 601

V.34 DSVD modems usually cost about \$100 more than common V.34 modems. Nonetheless, the Sportster Vi 28.8 is an outstanding value, packing lanely \$300 ProShare in for free. If you're looking for an economical way to share voice and data simultaneously over a single analog line, U.S. Robotics' Sportster Vi 28.8 is a great choice. Besthamln F. MILLER

Guide to the Ratings:

\*\*\*\* Excellent

\*\*\*\* Good

\*\*\* Acceptable

\*\*Poor

\* Unacceptable

#### The Slimmest Notebook Yet

Get used to strangers pawing your HiNote Ultra CT475. Meetings won't start until associates have passed it around the room. Fellow airplane passengers will insist on looking it over—top to bottom.

Why the attraction? Less than a year old, the wedgeshaped HiNote series brings one of the most resourceful designs to mobile computing since NEC introduced its highly versatile Versa line of portables four years ago. The newest addition to the HiNote family, the Ultra CT475, packs full multimedia capability into a machine that weights a mere \$7.00 multiple and \$1.00 multiple series of the series of the

Strip It Down Depending on your needs, you can whittle its weight down even further. The floppy drive attaches to the bottom of the unit. Remove it, and the weight drops to 4.3 pounds. Or, replace the floppy drive with the optional ultra-slim \$849 multimedia-docking wedge, dual-speed CD-ROM drive and two speakers. Sound quality can't compete with better desktop PC offerings, but it easily suffices for voice-overs and simple audio tracks in multimedia presentations. When attached to the docking station, the HiNote is still trimmer than most non-CD-equipped notebooks. And both drives are hot-swappable, so you needn't shut off the

The machine's design is noteworthy in other areas as well. Two elegant, concave mouse buttons wrap above and below a large center-mounted trackball. Interestingly, the rear-mounted battery pack flips down to prop the machine up to an agreeable typing angle.



Featherweight Power: Wedge-shaped and lithe, Digital's HiNote Ultra CT475 packs a 75MHz 486 CPU, 16-bit stereo sound, and a 9.5-inch active-matrix color display in a mere 4.3 pounds.

# Multimedia on the Fly Windows Performance 8% Faster 100444 TUSOUP 8% Faster 10044 TUSOUP 88% Faster 10044 TUSOUP 10044 T

With the battery pack flipped down, the standard complement of VGA, parallel, and serial ports is revealed (there's a PS/2 port on the side).

The keyboard layout is solid, despite a few odd placements that force the Enter key into a long column, rather than a wide row. Key travel is short, but typing is comfortable.

Lightweight For its diminutive size and weight, the HiNote packs in the features and functionality you'd expect from a high-end portable. Powered by a 78MHz.DX4, it outperformed IBM's multimedia ThinkPad 755CD, which uses a 100MHz version of the clock-tripled CPU. Its overall performance.

was on a par with Toshiba's Satellite T2150CDT. Our test system came with 16MB of RAM (8MB is standard), expandable to 24MB, and a stingy 340MB hard drive.

The 9.5-inch active-matrix display is the same size as that of Toshiba's Portégé, but it is a full inch smaller than IBM's Butterfly. It's bright and beautiful and capable of more than 64,000 colors at 640-by-480 resolution—perfect for presentations before an audience of up to three people.

Dual PC Card sloys come

standard with the Ultra CT475, and its developers say that compatibility problems that troubled early HiNotes have been resolved with this one.

#### FILEBOX

#### HiNote Ultra

flexibility.

Usability \*\*\*
Performance \*\*
Technology \*\*
Verdict \*\*\*
Pricey? Yes, but it has

Competition: Toshiba's Satellite T2150CDT provides equivalent or better power, but it doesn't offer the Reizbility that Digital's HiNote Ultra CT475 does, and it's not nearly as small.

Features as Tested: 75MHz 486 processor, 16MB of RAM, 340MB hard drive, lithium-ion battery, IRDA-2 infrared port, Sound Blaster 16-compatible sound, and 9.5-inch activematry streen

Docking Station Extras: Includes dual-speed CD-ROM drive and speakers.

drive and speakers. \$4,999 est. street price Digital Equipment Corp. (800) 642-4532 Reader Service Number 602

(We encountered no problems in tests with a wide variety of PC Cards.) There's also an IRDA 2 infrared port for zapping files between similarly equipped PCs or printers.

The HiNote Ultra's lithiumion battery yielded more than four hours of charge life in our tests—almost as long as Dell's amazing Latitude. Not too bad, you say? We agree.

If you can forgive the HiNote Ultra its small, nonremoveable hard drive, steep sticker price, and kludgy drive-locking mechanism, it's a rather seductive piece of hardware. You certainly won't find full multimedia capability in a smaller, lighter package. MARTY JEROME

## THE ALL-IN-ONE POWER TOOL



## Introducing MGA Millennium

Would you believe the only tool you need to accelerate all your Windows and DOS applications comes in one convenient package? And for as little as \$399!

Matrox's new MGA Millennium is the only graphics board power-packed with true color, video, 3D and game acceleration. This makes it the most comprehensive,

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#### Fast, Affordable Network Color

We thought it couldn't be done. Ink-jet printers aren't made to stand up to the lasers installed at the end of a network. Or are they? Hewlett Packard's Desklet 1600C and Desk let 1600CM printers will get your documents into your hands faster than any other ink-jet printer we've tested. And for a price that's about the same as an equivalent monochrome laser, the DeskJet 1600C and 1600CM printers deliver your documents in breathtaking color.

These babies are tough, too. The design is bigger and sturdier than the DeskJet 1200C/PS and Tektronix's Phaser 140 printer (the closest ink-jet comparisons), and the DeskJet 1600C and 1600CM printers are built to churn out pages rapidly.

It's Loaded The Desk Jet 1600C ships standard with PCL 5 with color and 4MB of RAM. The Desk Jet 1600CM is a beefed-up version, which adds PostScript Level 2. includes 6MB of RAM, and a JetDirect network interface card that supports Ethernet and LocalTalk networks.

Out of the box, the Desk Jet 1600C and 1600CM hold up to 180 sheets of paper. Not enough? No problem: Spend \$379 on the optional 500-sheet paper tray and you can print out Moby Dick. And don't worry about replenishing those ink cartridges every 15 minutes. Like the DeskJet 1200C/PS, the Desklet 1600C and 1600CM use a separate ink cartridge for each color.

Setup is simple. Plug in your cartridges, install your drivers (as simple as clicking on a few icons), and you're printing. Like most newer ink jets, the DeskJet 1600C and 1600CM



Downright Dazzling: HP's DeskJet 1600CM (above) and 1600C raise the bar for ink jets. They're fast-hook them up to your network, and you'll never look back.

Color Presentation	
	153% Faste
HP DESIGET 1600CM	
	33% Faster
HP DESKUET 1200C/PS	
100	Baseline
TEXTROVOX PHASER 140	

Take No Prisoners: No other color ink lets can hold a candle to HP's DeskJet 1600C and 1600CM Presentation output was more than twice as fast

as its competitors.

These new printers are also

FILEBOX

DeskJet 1600C and Desk let 1600CM

Usability Performance Technology \*\*\*\*

Outputs pages like there's no tomorrow-and they look great, too.

Competition: The only ink iets that come close are HP's Desklet 1200C/PS and Tektronix's Phaser 140. Neither offers comparable speed or black text output quality, though,

Features: PCL 5 with color. PostScript Level 2 6MR of RAM Resolution: 600 dpi for blackand-white output, 300 dpi for color output.

Cost per Page: Black text printing runs about 3 cents per page (assuming 5 percent coverage); color printing costs approximately 6.5 cents per

page (assuming 15 percent coverage). \$1,399, 1600C; \$1,999, 1600CM

Reader Service No. 602

feature a simple front-panel control and let you drive the printer through the software.

Classic Color Images from the 1600C and 1600CM are stupendous and text quality is topnotch. Either printer will hold up well in an office that prints a lot of text. Color graphics are crisp and sharp, and colors don't bleed together. The 1600C and 1600CM do an especially nice job with fine black lines in detailed graphics. Presentation output is also crisp, although solid backgrounds do appear blotchy-a minor quibble. For the standard, budget-conscious user, the output looks great on plain paper, which keeps costs down.

lightning-fast. There's just no comparison to any other ink jets. In our numerous speed tests, the Desk let 1600C and 1600CM were consistently twice as fast as Tektronix's Phaser 140, and they were around 30 percent faster than

the Desk Jet 1200C/PS.

All that speed will come in handy when you attach the Desk Jet 1600C or 1600CM to a network, which is where these printers belong. One drawback, however, is the fact that like most other ink-jet printers, pages emerge face-up in the output tray, which means they're in reverse order upon document completion. Handsorting pages is fine for oneto two-page jobs. But the 1600C and 1600CM are designed for longer documents. Also, if you're like a lot of people who lick their thumbs as they're restacking pages, you might create some ink smears if the documents are fresh out of the printer.

The DeskJet 1600C and 1600CM raise the bar for inkjet performance. They're fast, the output looks great, and they work well on the network. Who needs to spend \$6,000 on a color laser? If you need networkable color printing at a reasonable price, you may just need a DeskJet 1600C or 1600CM. KYLA K CARLSON

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- Microsoft<sup>\*</sup> Office
- Novell\* PerfectOffice\*\*
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## Introducing the new shape of advanced surge protection: SurgeArrest by APC

he simple truth may be disturbing: most PC's already have more surge protection built into them than that provided by most so-called "surge protectors," In other words, buying no protection at all is as good as under spending on one of the most important PC decisions you can make. Worse yet, the only way you'll find out your "protection" is (or was) inadequate is the hard way: the school of high shocks.

#### DON'T PLUG AND PRAY

While some things can be trusted to faith alone. proper power protection isn't one of them. Not surprisingly APC's SurgeArrest has become one of the fastest-growing

> lines of power protection in the world by doing what it says: stopping surges from damaging your sensitive electronics, today, tomorrow, Forever,

With a lifetime warranty, SurgeArrest will be the last surge protector you ever have

lifetime warranty, it will be PERFORMANCE FIRST, SAFETY SECOND

SurgeArrest is so advanced, its SafeShield design holds its own patent (#342,055). The smooth curves isolates your equipment from power problems, then pick them off one by one (see below). This multistage protection is far superior than single technology "surge suppressors." Moreover, a SurgeArrest is available for any application, including phone lines and cable TV, and performance is even backed by up to a \$25,000 repair/replacement guarantee on any properly protected equipment. Unlike competitive policies packed with fine print which disclaims their warranty for lightning strikes (just when you need it most!), SurgeArrest even provides protection against direct lightning strikes, so you can rest easy even in the worst storm.

Safe AC

SurgeArrest's (top) while Bra T lets through high levels to equapment (bottom)



But Surge Arrest goes beyond the performance you want to the safety you need. SurgeArrest's SafeShield design incorporates a fail-safe thermal fuse to reduce the danger of surge-induced fires, a site-wiring fault indicator to automatically diagnose dangerous wiring conditions, and Catastrophic Event Protection, to ensure that your delicate equipment is protected at all costs. even by sacrificing the unit. And since a "Protection Working" indicator is standard, you never have to wonder if SurgeArrest is prepared to take a hit. If the indicator goes out, simply call APC for a new Surge Arrest at no cost to you.

#### RECOMMENDED BY THE EXPERTS...

APC has won more awards for performance and reliability than all other power protection vendors combined. Not surprisingly, when PCWorld recently went shopping for the ideal surge suppressor for the home office, they came up with SurgeArrest, So protect yourself before you kick yourself. Ask for APC SurgeArrest with the SafeSheild design wherever quality computer products are sold.

#### OVER 2.000,000 SATISFIED USERS

"We used to believe all surge protectors were alike... but when a storm hit every surge protector we own was blown except for rrest. It's that much better of a product..."



#### How APC's PATENTED SAFESHIELD DESIGN PROTECTS YOUR EQUIPMENT

been granted U.S. Patent # 342,055. In addition to a multi-stage protection package, SafeShield provides a fail-safe fuse which guards against dangerous wiring faults, and catastrophic event protection to stop lightning strikes



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#### Microsoft Office for Windows 95

#### Moving Up to the 32-Bit Suite

If you're thinking there will be a shortage of 32-bit upgrades to Windows 95, better think again. Microsoft Office for Windows 95, the best-selling suite of mainstream business applications, is scheduled to arrive within 30 days after Windows 95 hits your hard disk. For many Microsoft Office users. it's an irresistible upgrade that offers the obvious benefits of long-filename support and seamless integration with the Windows 95 shell, Users of rival office suites will likely be frustrated: Windows 95 versions of Lotus's SmartSuite and Novell's PerfectOffice are still months away

Microsoft Office Standard Edition includes the familiar lineup of Word, Excel, and PowerPoint, and this time around it adds Schedule Plus, a group scheduling program that now doubles as a personal information manager (PIM). The Professional Edition, promised within 60 days after Windows 95 hits store shelves. will contain a new version of Access as well. (All applications now share version number 7.0.)

Subtle Changes Don't expect breathtaking changes in the Office interface. If you've grown accustomed to using Word 6.0 and Excel 5.0, you'll feel right at home with the menus and toolbars on the new releases. With a few noteworthy exceptions, changes are subtle and focus on enhancing usability in everyday tasks.

Every application has been fully rewritten in 32-bit code. That doesn't automatically



Open Sesame: Office 95's new File Open dialog box replaces the Windows 95 dialogs with a beefed-up set of templates and preview windows. Corresponding dialog boxes in the individual applications include fill-in-the-blanks forms you can use to search for files by content, type, date, name, or location.



Central Control: The Shortcut Bar offers onebutton access to tasks. apps, and documents.

translate to improved performance, of course, but it does mean that each app can run in its own memory space instead of sharing a single virtual machine like the older 16-bit versions did. Because we looked at a beta version of Office 95, we didn't benchmark performance, but generally the new versionsespecially Excel 95-felt snappier than their predecessors. A word of caution, though: You'll need a healthy dosc of RAM to run multiple Office 95 apps. On an 8MB test machine, we often found our system switching to virtual memory.

On a 16MB machine, performance improved dramatically.

Windows 95 supports multithreading, but the Office 95 apps make only limited use of this technology-most notably to permit true background printing. Instead, the developers concentrated on building a broad base of common code. including File Open and Save dialog boxes that provide thumbnail-size previews of the content in each document. AutoCorrect, the Word 6.0 feature that invisibly corrects common typing errors on the fly (changing teh to the, for example) now appears in all Office

#### FILEBOX

Microsoft Office for Windows 95

Usability Performance

The one Windows 95 upgrade that everyone will want. Competition: No Windows 95

competitors yet

System Requirements: Windows 95 or Windows NT version 3.51 or later: 8MB of RAM to run two apps, more memory recommended to run more than two apps simultaneously: 28MB to 89MB of hard-disk space.

Components: Standard Edition includes Word, Excel PowerPoint, and Schedule Plus, Professional Edition (available later) includes the same apps as those of Standard Edition plus Microsoft Access. \$499 est, street price for Standard Edition; \$599 for (800) 426-9400, (206) 882-8080

Reader Service No. 606

95 apps. And if you can't remember how to accomplish a task, all of the Office 95 apps offer an extension to the Windows Help system called Answer Wizard: Type in a plain-English sentence, and the Help system parses your question and suggests topics that might be useful in solving your problem. The net effect is a set of applications that feels far more integrated than in the previous version of Office.

Bye-bye, MOM The old Microsoft Office Manager introduced the concept of a suite-specific task-switching bar, which Novell and Lotus

\*\*\*\* Excellent

\*\*\*\* Good

\*\*\* Acceptable

\*\*Poor

\* Unacceptable

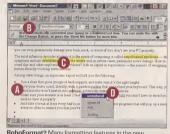
promptly trumped with more capable versions. Office 95 replaces MOM with the new Microsoft Office Shortcut Bar. The acronym may be more awkward, but the utility itself is simple and usable. The new toolbar anchors itself to the top of the screen or floats onscreen. just like in MOM. New additions include task-specific buttons that let you create new documents without first launching one of the Office 95 apps. You can also switch among multiple Office toolbars (using the Start menu's Programs list, for example) with a single click. Adding a shortcut to the MOSB is a simple drag-and-drop operation.

For anyone who creates complex documents filled with disparate data types, the most useful addition to the Office 95 lineup is the Binder. This double-pane window lets you drop data files (a Word document, plus an Excel chart and a handful of PowerPoint slides, for example) into the left pane. You can then work on them in the right pane as if they were a single document-numbering pages and checking spelling, for example, in continuous operations. Documents from other Office-compatible software, including Visio and Micrografx's Picture Publisher, can also live in an Office Binder.

Schedule Minus? The Schedule Plus upgrade (previously found in Windows for Workgroups 3.11) beefs up group-scheduling capabilities by adding a Meeting Wizard that automatically handles the drudgery of coordinating multiple schedules. Another intriguing Wizard incorporates techniques from Stephen R. Covey's best-selling book Seven Habits of Highly Effective People. But as an information manager, Schedule Plus is unimpressive. In a world where e-mail is more common than the paper variety, it's

#### **GUIDED TOUR**

FORMATTING WORD 95 ON THE FLY



RoboFormat? Many formatting features in the new Word work invisibly. No boxes to check, no buttons to click; just wait for AutoFormat to do its thing.

Ask Me Anything: The Answer Wizard, new to all the Office 95 applications, lets you type your questions in plain English. Then you can choose the most appropriate help topic from a list of suggestions. A. When you begin a line with an asterisk or a number, Word automatically changes your entry to a formatted bullet or numbered list

B. Word monitors your work, and the Tip Wizard offers suggestions for better and

more efficient ways of working.
C. To make part of a document stand out, use Word's new highlighting tool. By default, the "ink" is bright yellow.

D. Why turn spell-checking into a special occasion? Each time you pause, Word spell-checks your document and adds wavy red underlining to your misspelled words. Click on the right mouse-button for a list of suggested spellings.



troubling that there's no space for e-mail addresses in the Contact listings. Moreover, Schedule Plus 95 can't share contact information with the Personal Address Book in the Windows 95 Exchange client.

Importing and exporting Schedule Plus data is a night-mare. And although there are specific file filters for Symantee's Act and NetManage's Ecco Pro, the program can't handle dBASE files. Despite the many printing formats, there is, inexplicably, no way to print notes attached to tasks or events.

What's new in core Office 95 applications? See page 94 for a close-up of PowerPoint 95, and look for our upcoming review of Microsoft's Access 95. In this review, we'll focus on the two superstars of Office 95: Word and Excel.

Words of Wisdom Last time around, Microsoft introduced AutoCorrect, AutoText, and a host of other formatting features for Word. In version 7.0, these features get some much-needed enhancements.

In most cases, your documents simply format themselves, with no intervention on your part. Begin a line with a number or an asterisk, for example, and Word 95 instantly transforms your text into a numbered or bulleted list, Likewise, when you enter a short line of text without punctuation and follow it with a pair of carriage returns, it's automatically formatted as a heading. And anytime you add a row of dashes or equals signs to a document, Word 95 converts them to borders (unless you disable the autoformatting feature).

On-the-fly spell-checking is another usability home run. Each time you pause while typing a document, Word 95 checks the spelling of what you just typed. If the word isn't in the bull-in dictionary, it highlights the possible misspelling with a wavy red underline. Right-mouse-button click on the word to pop up suggested corrections or to add the word to the custom dictionary. It's a dramate timesaver, marred only by an incomplete dictionary that inceplicably excludes common technical terms like Internet.

Additional new and notable features include an Insert Address button that pulls names and addresses from either Schedule Plus or the Exchange address book. A highlighting tool adds yellow markings to text. And the scroll bars in all the Office 95 apps now include tips that tell you which page (or Excel edl) you which page (or Excel edl) or PowerPoint slide) you're about to land on. If you use Exchange to send and receive e-mail, you'll probably want to

# WHERE DO YOU WANT TO GO

# TODAY?

➤ Good question

Microsoft.

turn on WordMail, which replaces the puny Exchange editor with Word 95's more robust editing tools

Is this version of Word perfect? Hardly, Our beta version's scroll bars didn't use proportional thumbnail views, resulting in no feedback on how far up or down you can scroll in your document-a bug that should be fixed by ship time. Drag-anddrop editing works better than it did in Word 6.0, but the scrolling speed on even a 486 is still too fast, requiring unnecessary back-and-forth shifting before you can drop text where you want it. And because every title bar begins with the word Microsoft, the buttons on the Windows 95 Taskbar take on a numbing sameness that makes taskswitching more difficult than it needs to be.

Excel Automation For spreadsheet users, the most obvious changes to Excel are the automatic-formatting and data-entry options. AutoCorrect, for example, uses the same list as Word 95 to correct spelling. Excel 95 adds its own AutoComplete option, which automatically fills in the rest of a familiar word when you type a new entry in a list. There's also AutoCalculate: Highlight a range of cells-contiguous or scattered throughout a worksheetand look at the bottom of the screen where Excel displays the total for the selection. Right-click on the display to change the value to count, average, or another calculation.

Like all the Office 95 apps, Excel 95 takes full advantage of Windows 95's shortcugts. When you highlight a range of cells or information and drop it on the Windows 95 desktop, you end up with an icon that takes you back to that exact location next time you double-click on it.

#### **GUIDED TOUR**

INSIDE MICROSOFT OFFICE 95'S EXCEL



Tempting Templates: Excel 95's Template Wizard does the hard work for you, walking you through the process of data entry and consolidation.



Easy Calculations: Excel 95's new AutoCalculate feature automates tedious and repetitive calculations with a simple click of the right mouse-button.



One-Stop Shopping: In each of the applications, you'll find easier-to-use formatting options that are typical of the overall usability enhancements.



Simple Scrolling: Excel 95's scroll bar features ScrollTip feedback so you know exactly where you are in your spreadsheet as you scroll up or down.

The most intriguing Excel 95 additions are data-entry and access tools. The Template Wizard, for example, helps automate the process of collecting and managing flatfile databases, which are often stored in spreadsheets. You start by creating a simple data-entry form on a worksheet page. The Wizard converts the data fields on the form into links to a networked database. Once the template is complete, you can distribute it to users. Each time they fill in the blanks on the template, they get a paper copy of the form and, behind the scenes, a new record is

Another data-handling app that will earn fans among a select group of users is Data Map. This utility translates lists

added to the database.

from Excel to entries on a map. As the first implementation of the technology that Microsoft recently licensed from Auto-Map, it's more a harbinger of things to come than a genuinely useful piece of software.

Eventually, Excel will serve as the front end for data-entry forms that drive an Access database—a convenient feature for offices where workers are comfortable with a spreadsheet but may not have the training (or the license) to use an Access form. Unfortunately, our beta version wouldn't let us test this feature.

Our Excel wish list is rather short, but there's one item that's glaring in its omission: The unlimited Undo feature in Word encourages experimentation and creativity. But because Excel permits only a single level of Undo, users have to be far more cautious while editing worksheets. Multiple undo is long overdue in the other Office 95 applications, too.

Overall, Microsoft Office for Windows 95 is a curious upgrade. Its changes are modest but welcome. If it were just another version designed for Windows 3.x. we'd probably call it a minor set of bug fixes with a few new features thrown in for good measure. But because this is the single most important collection of 32-bit upgrades for the allnew operating system, it qualifies as a mandatory upgrade for any Office user switching to Windows 95. And we won't be the least surprised if there's a new Office release within a year.

## But what about tomorrow?

Ask Windows users where they want to go today, and their answer is likely to be this: Windows 95. It is, after all, a

> major advance in the state of Windows computing. And it does, finally, bring some of the innovations pioneered by Apple in 1984 to the PC desktop of 1995.

That's great, today, But where, one has to ask, is While other PC manufacturers are still strusvime to set CDs to load. Macintosl desktop computing going users can create their own multimedia work in 3-D, surf the internet and see tomorrow? And is moving what's real about virtual reality. Today

toWindows 95 really the right way to get there?

#### The future of computing.

In a word, it's multimedia. Microsoft and Intel say it's the future. So do we. The difference is, we deliver that future today. To see what we mean, simply turn a Power Mac"on. When you do, you can not only get down to work (or play) with the CD-ROM of your choice, you can also start using 3-D graphics. You can talk to your Mac." And have it recognize your command. You can videoconference across continents. You can even dive into virtual reality\* All at the touch of a few keys and the click of a mouse.

#### The power to do it.

To do all this, you need power. And the best way to get it is with a Power Mac. In recent tests, for example, the RISC-based Power Macintoshii 9500 outperformed a 120 MHz Pentium-processor-based



PC by 63% on average. When running scientific and technical apps, the performance advantage jumped to 80%. And for graphics, the

Power Mac was more than twice as fast." The easiest way to get there.

up entire new networks from scratch.



first introduced. Macintool designed from the start as a seamless integration of

Of course, all the raw power in the bardware and software. world is worthless if you can't use it. That's why every new Mac includes an innovative help system that doesn't just answer your questions, but shows you what to do, where to click and what to type to get things done. And why we make it so easy to create Internet connections, install new software and set

a RNC-hased PowerPC chits.

#### More choices than ever.

Today, every new Macintosh can read and write DOS and Windows disks. But our compatibility goes further than that The Power Macintosh 6100/66 hoth a 66 MHz 486 chip and DOS Compatible, for example, runs thousands of DOS and Windows appli-

cations, in addition to thousands of programs for Macintosh. And our new Power Mac systems accept standard PCI cards.

In the future. Apple innovations will further break down the barriers between cross-platform collaboration. Distinctions between the platforms themselves will diminish. Even the boundaries between applications will blur.

All of which will add up, once again, to the most important kind of power of all. The power to be your best."

To learn more about Macintosh power today, and tomorrow visit us on the Internet today at http://www.apple.com.



#### What Microsoft Left Out of Windows 95

Are you looking for an easy way to SNEAK get on the Net? PREVIEW Are you upgrad-

ing to Windows 95? Do you own a 486 or faster processor with at least 8MB of RAM? If you answered yes to all

three questions, go to the nearest computer store and pick up a copy of the Microsoft Plus add-on package for Windows 95. Some of the hottest features left out of the new operating system are packed into this \$49.99 Windows 95 utility.

One-Click Internet The best place to start with the Plus pack is the Internet Setup Wizard. Launch it and plug in just a few details about your method of Web access, and five minutes later you're out there surfing with Microsoft's Windows 95 Internet Explorer-a 32-bit Web browser designed to take advantage of Windows 95. It leaves Netscape Navigator's bothersome bookmark controls in the dust, offering URL Shortcut icons instead. These get stored automatically-and permanently, if you like-in the History folder, and they can be kept at your command in the Favorite Places folder as well. You can even copy a URL Shortcut to your desktop for double-click access to any site.

If you have a network connection, the Internet Setup Wizard sets up Windows 95's TCP/IP Network services for you. It'll configure your dialup connection automatically if you already have a local access provider. And if you don't have any type of World Wide Web access yet, it will connect you to the Web in conjunction with Microsoft Network.

Other Extras Microsoft Plus contains enhancements for Windows 95, as well. The



Toolkit: Microsoft Plus, the first add-on utility for Windows 95, contains many of the features you won't find in the operating system. Some are quite useful, some are just for fun. The Compression Agent offers three built-in file-compression formats and automatic compressedvolume creation. You can set it to choose and compress files automatically and in the background. Internet Wizard: An Internet Setup Wizard helps you set up an Internet connection via phone or across a network Microsoft Network subscribers will also be able to surf the Web directly.



Compression Agent simplifies the task of creating compressed volumes, which lets you reclaim the 25MB to 40MB of disk space you lose during Plus installation. The Compression Agent introduces DriveSpace 3, as well as a new compression format called UltraPacked, which really packs it in. DriveSpace can also automatically compress files in the background.

You'll also find an integral events-scheduling utility called System Agent, which automatically corrects disk-and-filestructure errors and launches a low-disk-space meter and warning system.

Desktop Themes is a fun and frivolous configuration utility that saves combinations of desktop wallpaper, colors, icons, sounds, fonts, and cursors as a single package. Microsoft Plus comes with several prepackaged themes including coordinated system sounds

that let you make simple changes or completely redecorate your desktop with ease. Other features include

Internet mail (specifically configured for Windows 95's Inbox) and a 3-D pinball game. You'll also find some powerful graphics features like a desktop CD icon that changes color and adds an image when a CD is installed, a Recycle Bin that spews crumpled paper when it's full, and full-window drag-letting you drag open windows around your screen while displaying their graphical contents (under Windows 95 alone, the contents of dragged windows are blank).

Although none of the features in the Plus pack are essential, many-like disk compression and Internet access-are excellent additions to any hard drive. If you're upgrading to Windows 95, this is \$49.99 well SCOT FINNIE

#### FILEBOX

Microsoft Plus

for Windows 95 Usability Technology

Verdict You'll welcome these capabilities to Windows 95.

System Requirements: Windows 95, 486 or faster processor, 8MB of RAM, 25MB to 40MB of hard-disk space. For Desktop Themes features users need 640-by-480-pixel resolution or higher with support for 256 colors (16-bit or 24-bit color preferred)

and a sound card. Features: System Agent Internet Jumpstart Kit. advanced disk compression. Desktop Themes, and Multimedia Pinball. \$49.99 est. street price Microsoft Corp. (800) 426-9400, (206) 882-8080 Reader Service No. 607

88







## **CEAR-CUT ANSWERS**

You choice of a portable PC may not seem me a crystal clear session at fint. There are about a gazillion portables to choose Wat some clearcet answers to what's right for you? Garavay 2000° offers quality portables with performance and fourest hell thrill you to chills. But whether or not a Gateway Libry" or CoorBook? portable PC is the right choice for you, what these guidelines before choosine your portable PC.

You'll need a 486DX2 processor at the very minimum. Every Gaeway 2000 portable PC includes a DX4 processor. A 486DX4 has the power to make your spreadsheets, graphics and word processing all run better and faster.

#### Carbo

Cache is great—that is when you can find it on a portable — because it gives you a superior performance. Our Liberty DX4-100 includes 256 K.12 eache on an accelerated local bus yielding Pentium\*-like performance. The ColorBook\* includes 5kEX yideo cache for great video performance.

#### Hard Date

Nothing less than a removable 340MB hard drive will do. In fact, you'll want the largest hard drive you can get. Microsoft® windows, DoS and standard software applications automatically cosume around 140MB at the time of purchase. And the Microsoft Windows 95 operating system takes about 160MB. All Liberty and 60nBook! PCs include at least a 340MB removable hard drive that can be ungeraded to a whopping 720MB.

#### P. I. H. Grander Street, Marrier V.

A bare minimum of 8MB RAM is best — 4MB wasn't enough last year. To adequately run Windows and Windows 95 you'll need 8MB. 8MB will also increase your battery life and improve system performance. All Liberty and Color Book's systems come standard with at least 8MB RAM and are excandable to 16MB or 24MB RAM.

When you're talking portables, you want the biggest, clearest display possible without adding weight or hiking up the price.

The IO4-mich Liberty screen has an incomparable screen size-toweight ratio of 2.44 giving you 23 percent more active viewing area than a 9.4-inch screen and 33 percent more than an 8,4-inch screen. The Liberty's 10.4-inch and ColorBook's 10.3-inch screens give you the best value available in a color display. With vivid colors and bright, clear screens, you'll forget you're working on a portable PC.

#### Size and Weigh

It's a portable PC — the smaller and the less it weighs, the better!

The Liberty and ColorBook<sup>2</sup> are leaders in these areas.

#### Batterie

Look for between four and five hours of battery life depending on the processor and RAM. Batteries based on lithium ion will give you the best performance. The Liberty gives you up to five hours or more with power management and a lithium ion battery.

#### Software

Included top-selling software applications increase the value of your portable PC. Gateway pre-installs Microsoft Works for Windows 3.0 or MS Office Professional 4.3 on all Gateway portables, as well as OAG® FlightDisk® and World Clock software.

#### Kerboard & Pointing Device

You'll need a keyboard that's comfortable for you and that's also easy to use. The Liberty is equipped with a large palm rest, and flipout feet so you can adjust the keyboard angle.

Pointing devices vary greatly. Again, find one that's easy for you to work with. Gateway's EZ Point<sup>w</sup> integrated pointer is uniquely positioned to be comfortable and easily accessible.

#### Infrared Technology or

Extras such as the Liberty's IR technology add even more value to your portable PC. With it you can take advantage of wireless file transfer — this means transferring files between the Liberty and your desktop for between two Liberty PCs) without eables!

#### . . .

Make sure you have the right support for your portable PC.
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Now that you have all the facts, go ahead and shop around. Then call one of our friendly sales representatives about the very cool Liberty and ColorBook<sup>2</sup> portable PCs from Gateway 2000.















Gateway 2000's portable PCs - the Liberty and ColorBook?

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#### Power to Persuade with Windows 95

SMEAK

Just because you don't sweat over every presenta-PREVIEW tion you create

doesn't mean there's no room for improvement when it comes to presentation software. Powerful new Windows 95 upgrades to Lotus's Freelance Graphics and Microsoft's PowerPoint make it easier than ever to build compelling presentations.

Both Freelance Graphics and PowerPoint offer dramatic improvements over their Windows 3.1 predecessors, especially when it comes to sharing and integrating information. Similarly, both programs work on the premise that content is paramount; each package attempts not only to help you create nice-looking presentations, but they also include predesigned content templates.

Team Review Planning to share your electronic presentations with other offices? Interested in group feedback? Then Freelance Graphics has your number, offering breakthrough technologies that allow groups of people to review and work on presentations together, and to electronically disseminate the presentation incorporating comments and multiple drafts. You can distribute a Freelance Graphics presentation for group review across a network, via floppy disk, or via Lotus Notes or another e-mail package.

Reviewers can mark up presentations by adding colorcoded electronic notes (similar to the ubiquitous yellow paper sticky notes) that include automatic time-anddate stamping. Consolidate all the comments into a single file, and you can view them simultaneously and incorporate



Presto Presentations: Windows 95 versions of Freelance Graphics and PowerPoint make easy work of creating fabulous presentations. Freelance Graphics' SmartMasters helps you select graphics. background colors, fonts, and even content.

Animated Audience: Among PowerPoint's impressive new offerings is a feature that helps you create animations and easily customize slide-show

transitions



information as you choose. These sharing features are particularly handy when you distribute a presentation via Notes. because you can use Notes' replication, security, control, and other features when reviewing the presentation.

Microsoft's PowerPoint also offers electronic-sharing capabilities in its new Meeting Minder feature. Using Meeting Minder, you can note discussion topics and action items during your presentation. At the end of your presentation, Meeting Minder automatically creates slides of action items for others to review. You can print these slides or send them electronically to colleagues.

Freelance Graphics breaks new ground with its enhanced SmartMasters, which walks you through the process of creating a presentation. In addition to including predesigned templates, SmartMasters now offers suggestions for how to include business and marketing plans, as well as sales and marketing information and advice

Content-Rich The volume of data is far greater in this release than in previous versions of PowerPoint. Although Microsoft has beefed up the Content Wizard in its Windows 95 release, the content is not as comprehensive or as easy to use as Freelance Graphics' latest offering.

#### FILEBOX

Freelance Graphics for Windows 95

Usability Technology Vordict Groundbreaking team-review makes this the premier presentation program. System Requirements: Windows 95 or Windows NT 8 MB of RAM 18MB to 40MB hard-disk snace.

Price not yet determined. (800) 343-5414, (617) 577-8500 **PowerPoint** for Windows 95

Usability Technology \*\*\*\* Verdict \*\*\*\* An excellent presentation program and the clear

choice for Office 95 users. System Requirements: Windows 95 or Windows NT. 6MB of RAM, 14MB to 35MB hard-disk space.

\$339 est, street price (800) 426-9400, (206) 882-8080 Reader Service No. 600

So how should you choose between the two? For integration with other Microsoft applications, PowerPoint is clearly the winner. However, for sharing presentations, facilitating group reviews, and distributing and marking up presentations across networks and via e-mail, Freelance Graphics is far superiorespecially if you work for a company that uses Lotus Notes. In addition, the depth of content in Freelance Graphics' SmartMasters places it a notch above PowerPoint. One thing is clear: If you're upgrading to Windows 95, you should also upgrade to one of these fine applications. PRESTON GRALLA



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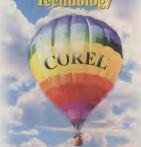


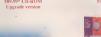
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#### Presenting AutoCAD LT Release 2



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will help you work taster and not \$495.00 wanting to learn it because it could slow you down. After all, it's unlikely that your clients will be sitting around waiting for you to get up to speed. What's the answer? Software from the leader in CAD that teaches you on-line and speeds your work—new AutoCAD LT—Release 2. Whether you're new to CAD, upgrading, or switching CAD packages, you'll find that AutoCAD LT is easy to learn and easy to use. Fast too, especially when you add one of the new \$99.00 AutoCAD LT architectural, mechanical or electrical pre-drawn symbols packages. So why get hung up wondering how quickly you can learn CAD. Buy AutoCAD LT and see.

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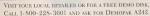
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But while IBM's Wireless LAN packs some terrific technology—data encryption, compression, and spread-spectrum transmission—its server support is lacking. The result is a powerful but limited solution.

quickly without the hassles of

OS/2 and NetWare The Wirdes LAN is goared specifically to networks using OS/2 or NetWare. Its base station or hab) includes drivers for OS/2 Warp and NetWare 3.x or 4.x, but there are currently and rivers for Windows NT as Windows for Workgroups. (BM is developing these drivers, which it says may be available later this year.)

And if you're using Ethernet adapters, you'll need Net-Ware to perform the bridging functions between the wireless segments (or cells) and the wired LAN. This is because the OS/2 base station drivers can't bridge to an Ethernet connection; they can handle only token ring adapters.

Installation and setup proved to be a challenge, but the bridging software worked flawlessly once we had it up and running. It let us retrieve information from the Ethernet segments



Live Without a Wire: IBM's Wireless LAN adapters let you quickly connect a notebook or desktop system to a cabled home network, provided it's running NetWare or OS/2; at press time, there was no support for Windows NT or Windows for Workgroups.



Still Slow: IBM's Wireless LAN is 52 percent slower than an Ethernet connection, but it spares you the hassle of additional network cables.

anywhere on the wired LAN.

As with most wireless solu-

tions, the Wireless LAN uses spread-spectrum radio technology with frequency hopping to ensure an interference-free 1Mbps connection. IBM has also added data compression for better throughput and encryption for security.

Wide Range The Wireless LAN is very flexible in the way that it lets you wander from location to location. Once connected to the network, it's easy to roam anywhere in the area of radio coverage. The network automatically adjusts frequencies as you move from cell to cell, which provides continuous connections even through obstructions like walls. IBM also took into consid-

eration the needs of notebook users and designed power management features into its PC Card version. This, coupled with a dual ISA/Micro Channel adapter for the base station (it's reversible, with an MCA connector on one edge and an ISA connector on one edge and an ISA connector on the other), effectively covers most of the systems on the market.

Overall, the Wireless LAN is great technology crippled by some design limitations. Support for only NetWare and OS/2 servers just isn't enough, especially when one of them

#### FILEBOX

Wireless LAN
Usability
Technology
Verdict
Powerful solution limited to
NetWare and 05/2 outfits.
Competition: Products like
AT&T's WaveLAN, Proxin's
RangeLANZ, Solectek's AirLAN,
and Xircom's Netwave all
provides imiting features, and

Minimum System
Requirements: 386 CPU;
Windows or OS/2; at least one
available ISA, MCA, or PC Card
Type II slot.

expanded network support at

Trivers Included: NOIS and ODI.

Other Features: The IBM
Wireless LAN Qustim Cable Kit
lets you install the radio
antenna up to 550 feet away
from the adapter to cover large,
multifloor offices, It also
includes an automated OS/Z
installation program.
SYB6 sets street prone for
ISA/MCA or PC Cardi, SSSO per
access point
IBM
SOB ACRES AND ACRES
SOB ACRES

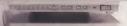
(OS/2) is limited to bridging between the wireless cell and a wired token ring segment.

IBM has promised to address most of these issues later this year (including adding server support for Windows NT), so you may want to give the Wireless LAN a second look once the kinks have been worked out of it. If you're looking for a more modest solution of limited scope, check out IBM's \$400 Wireless LAN Entry. It lacks some of its bigger sibling's advanced features such as encryption, but the lower cost may prove to be more palatable if you're on a tight budget, RANDALL C. KENNEDY

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#### **Record It Yourself**

I used to think that CD recorders were only for large-file freaks. But having Smart and Friendly's quad-speed CD-recordable drive (technically the CD-144000) for the last few months has proven that everyone needs one for something. I started distributing the latest ZD Llasb benchmarks to other lab technicians to archive the test results. Then word spread around the office that recordable CDs were cool, and things got interesting.

I backed up one colleague's entire system before she took the plunge and upgraded to Windows 95. Our resident multimedia guru put all his favorire audio and video test files on CD-ROM to get them off the local network where they occupied over 500MB of coveted shared space. My CD-R4000 emerged as a valuable resource for making space on crowded hard drives containing files that people don't access frequently but need within arm's reach. I was making friends as fast as I was making CD-ROMs.

This Yamaha-based quad-speed recorder is bundled with Adaptee's AHA-1540CF bus-mastering SCSI-host adapter and Corel's CD Creator software. Although installation requires a SCSI card, the package installed more smoothly than did other CD recorders on the market. It's not quite intuitive for novices, but it isn't too difficult, either. And the software is easy to use—so easy that people began recording CDs when I wasn't around, and my dwindling supply of blank discs had to be sequestered from public view.

DANIEL CARWIN

CD-R4000 / Smart and Friendly / (800) 959-7001 / 53,879 est, street price / Reader Service No. 671

#### Logbook Entries:

January 24, 1995: I installed the CD-R4000. Once the system recognized the drive, I installed Corel's CD Creator software. Now I can cut my first disc using Disc Wizard.

Februsy 10, 1995: I can't simulate CD-ROMs before I record them—so I can't play with them as virtual discs before creating actual CDs. Corel's tech support belps me replace standard drivers with extended drivers to do that.

May 17, 1995. I'm out of blank discs, but replacements are a bargain at about \$12. CD Creator's incremental-multisession feature is great for backup duties—it records only the files that have changed since the last backup.

#### Logbook Entries:

----

March 7, 1995: Setup is simple.
Within minutes I'm dialed in
and hopping between the front
page, news briefs, market
indices, my personal portfolio,
and the weather.

March 23, 1995: I'm learning that Personal Journal's lengthy downloads are a good time to make coffee.

May 21, 1995: For some reason, I'm tracking market news more closely in Personal Journal than I do in the newsprint version of the Wall Street Journal.

June 6, 1995: Figuring the market is ready for a crash, I sold out a couple of days ago. News of IBM's takeover of Lotus sent the Dow up 32 points to its third record high in four days. Oops,



#### E-News You Choose

Let me admit my bias up front: I'm a Wall Street Journal nut and I don't read other newspapers. Who cares about O. J., horoscopes, gossip, or other trivialities that local dailies call news?

I want business and computer news and nothing else. Also, I'd much rather get my information on my PC, where I can cut and paste it to wherever I like and print it whenever I like. I don't like flapping an oversize, smudgy hunk of newsprint while looking for the conclusion to a front-page story.

To my rescue comes Personal Journal, which includes an electronic bite of the Wall Street Journal. It's the right size, but it isn't yet perfect because I can't perform keyword searches (as I can on Compuserve Executive News Service), Sill, with Personal Journal I can mix and match ten of my favorite columns and stories on companies I want to track, and they become my personalized front page.

Over time I've learned that by downloop of the morning and evening editions, as well as the "This Just In 'section, I get a healthy helping of up-to-the-minute business and market news, including briefs on national and world events. My favorite section is "Portfolio," where I can track a maximum of 25 stocks and mutual funds. There's even a sports page, for those who care that the baseball strike endbessell strike.

Personal Journal lets me balance my bite-size information packets, but I can't really dig into them because the search options are limited. Nonetheless, the customizability and business focus of Personal Journal let me have it my way. It's all the news I see fit to print.

Personal Journal / Dow Jones / (800) 291-9382 / Free software with monthly subscription (\$12.95 for one edition, 50 cents for each subsequent version: first two weeks are free) / Reader Service No. 672



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# Pentium Killers?

#### SYNOPSIS

#### PENTIUM VS. Nx586:

Systems based on Intel's 133MHz Pentium still own the desktop—for now. 108

SUPERSYSTEMS: Rating the top high-speed Pentium and Nx586 systems. 109

#### PENTIUM CHALLENGERS:

An early glimpse of the first M1 system and the K5 chip show promise. But Intel's 150MHz Pentium is coming soon. 110

#### THE FIRST P6 SYSTEMS:

They're fast, they're cheap, and they're almost here. The inside story on Intel's successor to the Pentium. 112

#### FINAL ANALYSIS:

Choose the right supersystem. 114

nly a few months ago, our jaws dropped when we clocked the record-breaking performance of the latest crop of 120MHz PCs. But their reign as the champs didn't last long. The new winners boast speeds of 133MHz and beyond. Not only are the latest batch of systems significantly faster, they also mark

the dawn of a new post-Pentium era in PC architecture. Our tests of systems based on CPUs from Cyrix and NexGera, as well as our look at Advanced Micro Devices' K5 processor, reveal that for the first time in years there are viable alternatives to Intelbased systems. And the mind-blowing performance expected in the first prototype systems based on Intel's P6 chip—the successor to the Pentium—will more than likely prove that Intel is ready and able to comptee with a venegance.

Along with your newfound freedom of choice come some challenging questions: Is 133MFL enough? Should you wait for the P6? Is it safe to go with the alternative systems based on processors from AMD, Cyrix, or NexGen?

Just when you think you've reached the ultimate in PC performance—you've purchased the hottest PC you can find, packed it with as much memory and disk space as you can justify to your accountant—along comes the next generation to shatter your sense of fulfillment. As you ponder a shipin new 133MHz Pentium system, you feel your pulse quicken, your collar tighten. You know the symptoms that yearning for your spreadsheet to recale just a little bit faster, to make Myst appear just a little more realistic.

Deep down you know that one look at tomorrow's hot be xee—the Pe—will start the cycle all over again. But for now your caving is real, so we've sorted through the CPU quagmire to make your decision-making easier. We can 't completely satisfy that longing to make the next-generation operating systems run at the speeds they deserve. But we can help you prolong those serene moments when you're actually satisfied with your PC. After reading this article, you can make a purchase to last a lifetime. OK, maybe not a lifetime. But at least you won't have to shop for a new PC next month.

BY RANDALL C. KENNEDY

SPEED TD BURN: With its new 133MHz Pentium chip, the Gateway P5-133XL holds on to the title of world's fastest PC.

B NEW x86: The M1 processor from Cyrix produces performance numbers that challenge even the 133MHz Pentiums.

RISC-BASED CORE: AMD's K5 has all the high-end components of the Pentium and the P6—and will deliver price and performance to match.

THE NEXT GENERATION:
The P6—the latest and greatest from Intel—promises to set new performance records and usher in an exciting era of desktop power.



## The **Pentium** Charges Ahead

**Executive Summary** 

Pentium-based PCs are getting faster and faster. With the addition of six-speed CD-ROM drives, high-end video cards, and advanced memory features, these systems finish the job in a flash. And Intel is no longer the only one offering PCs with triple-digit clock speeds. Pentium-class systems featuring NexGen's Nx586 chip are here to challenge Intel's crown. But they can't compete with 133/Hz systems from Dell Computer, Gateway 2000, and Micron Electronics—for now.

133MHz Systems To find the fastest system, the clock speed is only the starting point. What separates the winners from the wannabes is how they harness raw horsepower into a well-engineered package. It was no surprise to see three of our four 133MHz Pentium submissions—Seateway's PS-133XL, Micron's P133 Millennia, and Dell's Dimension XPS P133c—dominate the performance charts. We were surprised, however, at the relatively poor showing of the four computers we tested based on NexGen's 100MHz. Nx586 chipt these systems lagged further behind both the 120MHz and 133MHz Pentium offerings than expected in the Winston of Sapplication benchmark.

Among the Pentium-based machines, the only slowpoke was USA Flex's Flex PT-133 system. Its low score resulted from its lack of EDO memory and burst-mode cache, which were absent on our test system but will be available as options on future USA Flex systems. However, the Flex system—along with six other top performers—offered usability good enough to earn PC Computing's seal of approval. Overall, these Pentium machines provided some of the most exciting performance results we have ever seen. Gateway's 95–133XL proved to be the real speed demon, with overall performance 30 percent faster than a 100MHz Pentium. The Micron and Dell systems clocked in at 29 and 26 percent



NOTE WINSTONE 95 IS A BENCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS



Killer PC: Gateway 2000's P5-133XL whizzed by the competition on the strength of its Matrox video card—plus the power of EDO memory and other high-end components.

The extras also make a big difference, and we were impressed with Gateway's inclusion of a three-CD changer. The solution isn't perfect—you have to insert the CDs upside-down, and the layout, with the FI drive on the top and D: drive on the bottom, is counterintuitive—but it's still better than settling for a single CD-ROM drive. Unless, of course, that drive is one of the six-speed screamers from Plextor that Micron bundles with its 133MHz offering.

120MHz Systems Micron's P120 led the way, performing 24 percent faster than a 100MHz Pentium in our Windows application tests. Close behind were Gateway's P5-120XL, Polywell's Poly 5120T1, and Dell's Dimension XPS P120c. All outperformed the Nx586 systems by a wide margin.

NA586 Systems If you had to use a single word to describe the Nx586-based systems, it would have to be disappointing. With all of NexGen's hype over its "Pentium-killer" CPU, we expected more. The fact is, we've seen better results from 90MHz, and in some cases, 75MHz Pentium systems. The 100MHz had Storage NX5-100 and Alaris Nx586 Pl00 systems based on NexGen's top-of-the-line CPU lag far behind the 120MHz Pentium in overall performance. This is due in large part to the Nx586 chip's support for the slower VESA local bus standard instead of PCI. These systems are untermathable, both in terms of the type of components used and the lack of included advanced storage and used output Standard instead of included advanced storage and used output Standard instead of included advanced storage and used output Standard instead of included advanced storage and used outputs.

#### Rating **High-Speed Systems**

How They Measure Up in Our Lab Tests

System	Gateway P5-133XL \$4,399 133MHz Gateway 2000 Pentium 1:		Performance	Usability	Technology	Verdict	
Gateway 2000 (800) 846-2000			*****The fastest 133MHz Pentium overall.	****A three-CD changer, complete with front audio controls.	***** Cutting-edge components.	****½ If this PC doesn't have it, chances are you don't need it.	
Dimension XPS P133c Dell Computer Corp. (800) 727-3355 Resider Service No. 721	\$3,849	133MHz Pentium	***** Best 133MHz CPU performance.	****Design shows attention to detail.	****PCI and a Western Digital hard drive make for fast data access.	* * * * A superb killer Pentium with a six- speed CD-ROM drive	
Gateway P5-120XL Gateway 2000 (800) 846-2000 Reader Service No. 722	\$4,069	120MHz Pentium	**** Screaming- fast storage subsystem.	****Includes a three-CD changer with front audio controls.	****PCl quad- speed CD-ROM drive and a Western Digital hard drive.	* * * * A great system, but we'll take its 133MHz sibling.	
Micron P133 Millennia Micron Electronics (800) 515-9197 Reader Service No. 723	\$4,199	133MHz Pentium	***** Second only to Gateway's P5-133XL.	**** Case and interior are easily accessible.	****Includes a Plextor six-speed CD-ROM drive.	* * * * High-performance speed demon.	
Dimension XPS P120c Dell Computer Corp. (800) 727-3355 Reader Service No. 724	\$3,599	120MHz Pentium	*** The second- fastest 120MHz Pentium.	**** Case is easily accessible.	****Top-of-the- ine components,	* * * ½ An excellent value.	
Micron P120 Millennia Micron Electronics	\$3,599	120MHz Pentium	**** Best- performing	**** Case comes off easily.	****Includes Diamond Stealth 64	***½ Excellent all-	



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competition on the strength of its Matrox video card—plus the power of EDO memory and other high-end components.



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#### **Rating High-Speed Systems**

How They Measure Up in Our Lab Tests

System	Price*	Chip	Performance	Usability	Technology	Verdict
Gateway P5-133XL Gateway 2000 (800) 846-2000 Resider Service No. 720	\$4,399	133MHz Pentium	*****The fastest 133MHz Pentium overall.	****A three-CD changer, complete with front audio controls.	***** Cutting-edge components.	****  If this PC doesn't have it, chances are you don't need it.
Dimension XPS P133c Dell Computer Corp. (800) 727-3355 Reader Service No. 721	\$3,849	133MHz Pentium	***** Best 133MHz CPU performance.	****Design shows attention to detail.	**** PCI and a Western Digital Fard drive make for fast data access.	*** A superb killer Pentium with a six- speed CD-ROM drive
Gateway P5-120XL Gateway 2000 (800) 846-2000 Roader Service No. 722	\$4,069	120MHz Pentium	**** Screaming- fast storage subsystem.	****Includes a three-CD changer with front audio controls.	****PCl quad- speed CD-ROM drive and a Western Digital hard drive.	*** A great system, but we'll take its 133MHz sibling.
Micron P133 Millennia Micron Electronics (800) 515-9197 Reader Service No. 723	\$4,199	133MHz Pentium	*****Second only to Gateway's P5-133XL.	**** Case and interior are easily accessible.	****Includes a Plextor six-speed ED-ROM drive.	*** High-performance speed demon.
Dimension XPS P120c Dell Computer Corp. (800) 727-3355 Resider Service No. 724	\$3,599	120MHz Pentium	**** The second- fastest 120MHz Pentium.	**** Case is easily accessible.	****Top-of-the- line components.	* * * ½ An excellent value.
Micron P120 Millennia Micron Electronics (800) 515-9197 Resider Service No. 725	\$3,599	120MHz Pentium	**** Best- performing 120MHz CPU.	**** Case comes off easily.	****Includes Clamond Stealth 64 card for fast video.	* * * ½ Excellent all- around choice.
Alaris Nx586 P100 Alaris (800) 317-2348 Resider Service Na. 726	\$2,249	100MHz Nx586	***Windows performance lagged.	*** Not Plug-and- Play-ready.	*** Relies on slower VESA local ous interface.	* * * A low-cost entry-level PC.
DataStorage NX5-100 Data Storage Marketing (800) 543-6098 Reader Service No. 727	\$4,225	100MHz Nx586	*** Best overall performance of the Nx586 PCs.	***Design could be sturdier.	*** Snappy video card and lard drive.	* * Price is hig for its performance.
DeskSaver NX586-100 Duracom Computer Systems (800) 551-9000 Reader Service No. 728	\$3,499	100MHz Nx586	*** A fast Nx586- but still slower than Intel-based Pentiums.	***CD-ROM drive uses caddy; case is easy to access.	*** Plenty of multimedia extras.	* * * A fine multimedia system, middling performance.
Flex PT-133 USA Flex (800) 777-2450 Reader Service No. 729	\$4,995	133MHz Pentium	*** The slowest 133MHz Pentium we tested.	****Plenty of room for expansion.	** Lack of burst- mode cache held back performance.	* * Expensive for its class.
Poly 5120T1 Polywell Computers (800) 999-1278 Reader Service No. 730	\$3,800	120MHz Pentium	**** Consistent all-around performance.	**CD tray s fragile.	***All the basics.	* * A solid if pricey Pentium.
Blackship Nx-100 Nautilus Blackship Computer Systems (800) 531-7447 Roader Service No. 731	\$2,695	100MHz Nx586	***Low-end components hampered performance.	** Overall design could be more solid.	***Speedy Western Digital Perd drive.	**½ Performance lags.

\*ESTIMATED STREET PRICE.

## **Future** Choices

Executive Summary

Choice is good. In the case of x86 CPU technology, choice means additional playersspecifically, Cyrix and Advanced Micro Devices-and more options for the buyer. Both of these companies are readving their own challengers to the Pentium, and the preliminary results look promising. The bottom line is that consumers will have more speed and more choices, at lower prices, And still, CPU technology rolls on.

Truth be told, the Pentium-level CPU market is rapidly becoming crowded, with too many vendors offering too little innovation or product differentiation. For relief from this market malaise, we look to two new chips-the K5 from Advanced Micro Devices and the M1 from Cyrix. The easiest way to see what's new and different about these CPUs is to evaluate what isn't so new and different, that is, technologies that are already integrated in chips from Intel and NexGen.

Pentium vs. the World Compared with the upstart CPUs, the Pentium is looking downright dated, at least from a technological standpoint. Lacking features like speculative execution, multipleinstruction execution, and renameable registers, the Pentium may have trouble competing against offerings from AMD and Cyrix-until Intel's P6 systems start shipping. But as NexGen's Nx586 has demonstrated, cutting-edge technology doesn't always translate into superior performance. It remains to be seen just how fast K5 and M1 systems will be when pitted against Intel's forthcoming Pentium clock-speed doubling and tripling efforts. As it stands, 150MHz Pentium PCs are just around the corner. Hot on their heels will be Intel's newest processor, the P6, clocking speeds of 133MHz and faster, and offering more technical advantages than competitors' Pentium-class products (see "P6: Fast, Cheap, Soon," page 112).



NOTE: CPUMARKIS IS A TEST IN POSENCH R.O., WHICH IS DESIGNED TO MEASURE RAW PROCESSOR PERFORMANCE



Killer Pentium? Cvrix's forthcoming M1 processor is expected to beat the Pentium's price-performance curve in a system that will be fully x86-compatible.

Both the K5 and the M1 feature superscalar, superpipelined designs that speed execution by decoding and executing instructions in stages. Both use multiple, renameable registers to allow speculative execution and out-of-order completion, as does the NexGen's Nx586. Even the L1 cache size, 16K, is identical in the two chips, and the same as the cache size of today's Pentium (the Nx586 includes a 32K L1 cache). All of these features are either currently found in processors from Intel or NexGen, or will be available in the P6 later this year.

With the Nx586, NexGen's flagship chip, failing to deliver clock performance equal to that of today's Pentium, you have to wonder just how well the chips from Cyrix and AMD will fare when they enter the same arena later this year. Will their differentiating technologies be enough to give them an edge over Intel's reigning champion?

Cyrix might just be able to pull it off with the M1. Cyrix has taken a slightly different tack from the other vendors, avoiding the RISC-core route in favor of optimizing the chip to execute native x86 instructions. Cyrix claims to have solved the x86 instruction bottleneck-caused by things such as variable-length instructions, data dependencies, and limited registerswithout resorting to RISC-based emulation, Cyrix also claims to provide better than twice the Pentium's performance at comparable clock speeds.

New Processor Tricks Like NexGen's chip. AMD's K5 features a RISC core with on-chip emulation to execute x86 instructions. However, it differs



Upgrade Now! One of the main features of Cyrix's M1 processor is complete Pentium pin compatibility.

execution pipelines-a real performance boost. The net result is a chip that can issue as many as four instructions per clock cycle; the Pentium can issue only three. AMD claims that this four-issue design will translate roughly into a 30 percent performance edge over similarly clocked Pentium processors.

in how it handles

instructions before

executing them; the

K5 can pre-decode

instructions as they

are placed in its

onboard instruc-

tion cache, making

them essier to work

with as soon as they

arrive at the actual

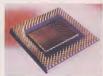
One fact that both AMD and Cyrix seem to recognize is the need for pin compatibility (or something close to it) with the Pentium. Both the M1 and K5 parts use pin-signaling layouts similar to the Pentium's, making it easier for vendors to adapt existing system-board designs to the new CPUs. AMD goes even a step further, offering a P54Ccompatible version that works with most 486-system Pentium OverDrive sockets. This means that with a mere BIOS upgrade (which you can do with software), you can replace your old Pentium chip with one of the new chips from Cyrix or AMD.

You might expect that there isn't a whole lot to get excited about in this Pentium-class CPU technology, which might be why both Cyrix and AMD are trying to steal some of the P6's thunder by repositioning their offerings as sixth-generation designs. Surprisingly, Cyrix's M1 processor delivers impressive performance, On PC Computing's PC Bench 9.0 CPUMark16 processor test, a 100MHz M1 system outperformed all of the 120MHz Pentium systems we reviewed. If the M1 can deliver that kind of performance in a Windows environment, Cyrix will really have something to talk about. How good is the M1's essential pin compatibility? You can just pop a Pentium processor out of a Micron system, drop in Cyrix's M1, and presto-instant turbocharge. And because the processor is strictly compatible with the x86 instruction set, you don't have to worry about whether you'll be able to run your favorite Windows software on an M1-based system, Cyrix will follow later this year with a smaller, 120MHz M1, which the company says will approach the performance of a 150MHz Pentium.

The bottom line for consumers is an old equation: price vs. performance. If AMD and Cyrix can

deliver faster computers at a price that is as good as or better than the prices of the current multitude of Intel-based PCs, the companies will have a fighting chance. Failing that, Intel will continue to dominate the chip world.

Even though the developing processor technologies are more advanced than the



Tomorrow's Technology Today: AMD's K5 processor uses a RISC core that translates x86 code.

Pentium's, and in many cases comparable to the P6's, white papers and theoretical diagrams don't always translate into actual system performance. And with faster Pentiums and the P6 just around the corner, the future might not look all that rosy for Intel's competitors. It remains to be seen if vendors can pair these chips with systems that will give users the best price-performance ratio.

#### Evaluating Next-Generation CPUs

Processor	Speed	Price*	Unique CPU Features
K5 Advanced Micro Devices (800) 222-9323, (408) 732-2400	100MHz	\$2,000 to \$4,000	RIS 1 Fore, four instructions per clock cycle, branch prediction, Pentium in compatible, decoder for x86 instructions.
M1 Cyrix Corp. (800) 462-9749, (214) 968-8387	100MHz 120MHz	\$2,000 to \$2,500	CISC core, two instructions per clock cycle, branch prediction, Pentium pin-compatible, 16K onboard cache, completely compatible with x86 instruction set.
Pentium Intel Corp. (800) 548-4725	150MHz 167.7MHz	\$3,000 to \$4,000	CSC core, two instructions per clock cycle, branch prediction.

## **P6:** Fast, Cheap, Soon

#### **Executive Summary**

Intel's new PB CPU was designed from the ground up for multiprocessor servers, right? Yes and no. Many of the P6's technologies—which roughly double the performance of a Pentium CPU—make a good case for using the P6 in a desktop system, not just servers. If technology alone doesn't convince you, price might. Thanks to today's chip wars, P6 systems will cost only slightly more than today's full-featured Pentium PCs right out of the gate.

You greedy devil. Impatient with Pentium performance already? Imagine twice the power—no, make that eight times the power—of your current Pentium system. That's what Intel's spanking-new P6 chip offers, just for starters. Now imagine putting your hands on it today.

We did.

Several hush-hush early previews of the first Posystems gave us a glimpse of what the future holds. The good news is that you'll be able to own a P6 system far sooner than you thought you would. The lazy days when next-generation CPUs ambled their way down the price curve to affordability are now history. An all-out thip war is currently under way, and P6 systems that cost less than \$4,500 will hit the streets before Christmas. We've seen them.

Sługfest You can thank your friends at Advanced Micro Devices, Cyrix, and NesCen for this happy news. All three companies have begun (or will soon begin) shipping their Pentium clones—the K5, the M1, and the Nx586, respectively—which will bloody Intel's Pentium in price as well as in performance (see the graph below). Pentium-class systems that zoom at 90MHz will sell for well under \$2,000 before the end of the year.

Meanwhile, Intel isn't idly allowing its technology leadership to get scuffed in the fray. Breaking with the past, the company plans to put its next-gen-

eration P6 on the desktops of millions of ordinary businesspeople as quickly as possible. When the 486 and Pentium processors were introduced, system prices hung in the \$8,000 to \$15,000 range for nearing a year before you and I could afford one. With the P6, it's a whole new ballgame: Some of the first P6 systems will be deskton PCs.

This has taken many analysts by surprise, because no other Intel CPU is as well suited to being a network server. Why? P6 systems can run as many as four CPUs, each of which has roughly twice the computational power of a 75MHz Pentium.

Also, the P6 uses superscalar pipelining, which decouples the decoding part of an instruction from the execution part (AMD's K5 and NexGen's Nx586 also do this). This allows instructions to be executed out of order, and it reduces the amount of time the CPU remains idle waiting for the next instruction to chug down the pipeline—a key to fast server performance.

In addition to the P6's wide 36-bit address bus, there are dual 64-bit data buses, one of which connects to a built-in 256K L2 eache (a 512K version will be made available as well). For heavy transactional processing typical of network servers, an L2 eache eliminates bottlenecks. And because the eache is built in to the CPU itself, it is far faster than the external eaches many manufacturers tag on to Pentium and 486 servers. Intel claims that the 512K version will offer performance equivalent to a 3MB external eaches

Technical advantages aside, the main reason punding and analysts believed that the P6 would initially be a CPU for servers is that the Pentium is hardly dead. Intel's P55C, which runs at 150MHz, should arrive at about the same time as the P6 and greatly narrows the performance gap between the two CPUS. Use the Pentium in the desktop system, the P6 in the server—a sold strategy, right?

Complementing the CPU As important as the PG itself, is Intel's PCI chip set for the CPU: the P6 PCISet. This provides dual PCI buses, effectively doubling the current 132Mbps bandwidth of today's 32-bit PCI local bus. The new chip set provides evicial data bridges between as many as four CPUs and includes a four-way interleaved memory subsystem, which is key to optimum server performance.

Unfortunately, even when the 76 PCISet ships, it won't support advanced memory technologies, such as extended data out (EDO) RAM, synchronous dynamic RAM (DRAM), or high-bandwidth Rambus DRAMs. All of these technologies can boost throughput by as much as 10 percent while adding little to the cost of a system. Unfortunately, you'll have to wait for the next version of the 76 PCISet before you can use

#### **Performance:** Estimated CPU Power



SOURCE: MICROPROCESSOR REPO



any of them (and thus far Intel has only committed to EDO support). It's another reason that businesses shopping for a server may hold off on the P6.

Meanwhile, support for advanced memory technologies is less crucial to single-user systems, except for highly demanding multimedia applications, in which one bus, for example, communicates with a video source, leaving the other free to traffic data to and from a network card, hard drive, and other peripherals. Intel will probably release a cheaper PCI chip set designed for only one CPU within the year (company officials decline to comment). Meanwhile, several other manufacturers already have dual-bus PCI solutions for the P6 on their blackboards-if not in actual testing.

Finally, there is still some trepidation about heat concerns-especially for servers running three or more CPUs in their boxes. Whether or not overheating will be a serious problem remains to be seen, although Intel officials insist that it is not a problem and quickly point out that the same suspicions about the Pentium proved to be unfounded. Heat issues may resurface when the 200MHz version of the chip ships; the first P6 runs at 133MHz.

CPUs Aplenty Although price alone is a good reason to look at the P6 as your next desktop system, who needs a multiprocessor PC as a single-

user machine? The idea isn't as far-fetched as it sounds. Companies that bought systems with Intel's OverDrive sockets as a hedge against obsolescence now have another option. When applications begin to dog system performance, just drop in a secondor a third or a fourth-CPU

Oddly enough, the big winner in all of this might be Microsoft's Windows NT operating system. Not only does Windows NT support multiple processors, but also it can run 32-bit Windows 95 applications. Furthermore, although Windows NT's interface is looking a little long in the tooth (a facelift is planned for the near future), it's still an optimum platform for engineering, multimedia, high-end publishing, and number-crunching applications that benefit from multiple processors. Windows 95 does not currently furnish that support. And not only 32-bit operating systems, but 32-bit applications as well, are going to receive a significant performance increase from the P6.

Even workaday power users have good reason to consider a P6 as their next system. For the first time since the original IBM PC was introduced, you can now get the power you crave when it's first available-not just when prices finally drop out of the stratosphere. MARTY JEROME AND WENDY TAYLOR

## **Speed** to Burn

With all the choices at hand—CPU brands, speeds, peripheral—it's easy to get sidetracked in your buying decisions. The last word? If you warn all-out performance, any of the 133MHz systems will blow the socks off your most demanding applications. In this class, Gateway 2000's 19-133XL stands out with the best overall Winstone 95 score. A new Matrox video card gives it an edge over its 133MHz brethren. Both Micron Electronics P133 Millenian and Dell's Dimension XIPS 19138 match the 19-133XL in processor performance.

The key to fast performance is more than a highpeed CPU, however. USA Flex's 133MHz, Pentiumbased Flex PT-133 is slower than many 120MHz systems due to its lack of EDO memory and pipelined burst-mode caching. Its performance should improve when these ordions become available this fall.

For 120MHz systems, if you want to shave a few dollars off the price, both Gateway's P5-120XL and Micron's P120 Millennia offer good value. Polywell's Poly 5120T1 is also a good, solid deal at \$3,800. Of the 100MHz Nx586 crowd, only the bangainbasement models from Alaris and Blackship Computer Systems are worth considering. These machines compare well to 90MHz Pentium systems in terms of performance. And their price points are comparable to Intel-based systems of similar performance. Data Storage's NX5-100 and Duracom's DeskSaver NX580 age's NX5-100 systems are too pricey for the performance. For virtually by the same price as the NX5-100 systems rou can get Cateway's PS-133XL system with the slick three-CD changer. Look for newer PCI-based Nx586 systems to improve Nx560—based systems' performance eds.

Finally, look for systems based on Cyrix's M1 to appear soon. With excellent processor performance, and systems expected to be in the \$2,000-to-\$2,500 price range, Cyrix could be the value to beat.

RANDALL C. KENNEDY is a free-lance technical writer based in Albany, California. Labs project leader IBRAHIM GUL also contributed to this article.





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Of course, all these kits give you 100% Sound Blaster compatibility and upgradeability to wave table synthesis." And all the technical help you need is just a phone call away. So installation is a no brainer. Want more information? Just visit your nearest Creative Labs dealer.

"Not applicable to Sound Blaster Performance 4x

Circle 110 on reader service card.



# Mobile Superguide

#### SYNOPSIS

BUDGET: What can you get for less than \$2,500 in a portable? A lot. \$3

WORKHORSE: Think you need to compromise speed in a notebook? Think again, S7

MULTIMEDIA: The portable pickings for creating presentations never looked better. \$13

POINTING DEVICES: Our labs put three of the most popular pointers to the test. \$19

PC CARDS: Expansion in abundance-modem. network, combo. hard drive, sound, and SCSL S21

MOBILELUST: Add-ons that bring you all the comforts of home, and then some. \$29

an't resist stealing a long look at that road warrior's notebook as you walk up the cabin aisle, can you? Hmmm... big color screen, audio jacks, even CD-ROM. It must have cost a fortune, you decide. Guess they're not making no-frills notebooks for occasional business travelers anymore. Not so, not so.

While the industry-standard 6.5-pound, \$3,000 color notebook is still alive, the past year has ushered in a host of portables that are both heavier and lighter, more expensive and cheaper, fuller featured and leaner.

The fact is, today's notebooks don't try to meet every business need with a single solution. And frankly, there is no real industry-standard notebook any longer. As more companies come to view mobile computing as a natural and crucial extension of the office, the capabilities required of portable PCs have grown astonishingly diverse.

The notebooks we tested reflect this diversity. Although we grouped and tested the notebooks in three categories according to general business needs-budget, workhorse, and multimedia-variations within each category for performance, usability, feature set, and price are dramatic. You will almost certainly find a notebook that fits your range of mobile-computing requirements.

Because no portable PC provides a complete solution, we also rounded up and tested scores of add-ons and peripherals that give your notebook the capabilities of a desktop system. Weeks in PC Computing's labs yielded a pleasant surprise: The nightmare of PC Card compatibility is quickly receding, thanks to the fact that the PC Card '95 specification works with Plug and Play.

The PC Card interface isn't the only frontier for notebook innovation, of course. Multimedia for business presentations is another; portable docking stations with multispeed CD-ROM drives and high-quality speakers are turning up everywhere. Big PC Card hard drives are widely available. Indeed, solutions abound. This superguide should ease the burden of finding the right one for you.

BUDGET: For a mere \$2,299, Texas Instrument's TravelMate 4000M is stocked with a 75MHz DX4 processor, a 455MB hard drive, and 16-bit sound.

WORKHORSE: Midwest Micro's SoundBook Plus has a 90MHz Pentium onboard. so you can feed your need for speed. You'll never miss your desktop.

MULTIMEDIA: Let IBM's ThinkPad 755CD be your portable presentation tool. . Weighing in at under 8 pounds and complete with DSP, CD-ROM, and the capacity for video, it's multimedia magic.

BY MARTY JEROME













## Portables for a **Pittance**

#### **Executive Summary**

Look how far your dollar goes. Texas Instruments' TravelNatea dollow offers the best performance among the budget notebooks, along with a rich feature set and big hard drive. While it's one of the most expensive of the group, it's still under \$2.300. Hats off as well to Toshiba's Satellite T2100CS, with its long battery life, lots of storage, and \$2.099 price tag. Broadax Systems' NT7546D, also inexpensive, is fast and feature-rich, if somewhat heavy.

Leave the big iron for traveling business presentations and high-end computational work. Most of us have simple needs when we're on the road: a core set of productivity applications, e-mail, and fasing. Of course, simple needs aren't what they used to be. At a minimum, you'll want your notebook to pack a 50MHz DX2 with 8MB of RAM and at least a 200MHz drive. If you're running Windows 95, you'll need all of that. You'll also want your notebook to be lightweight and have a long battery life. The machines met—and execeede—those criteria. The good news' All of them cost under \$2.500. two cost less than \$2,000.

Highlights Texas Instruments' TravelMare 4000M takes top honor for performance. It was the only system in this category to come with a 75MHz DX4, although a speedy graphits chip set spurred it along as much as its fact CPU. Broadax's NUF7464D, power by a 66MHz version of the 486, trailed only slightly behind the TravelMare, helped largely by its fast hard drive.

Of the three notebooks with 50MHz CPUs, Toshiba's Satellite T2100CS fared far better than either Zenith's Z-Star EX or Austin's StepLite. The latter are excellent machines in other respects, but they clearly need a boost in performance.

Åll five machines have lårge, dual-scan, passivematrix color displays, proving the high practicality and durability of that technology. The Satellite T2100CS's 10.4-inch display was the largest, followed by the NP7546D's 10.3-inch screen, which was the brightest.



Traveling Deal: The TravelMate 4000M packs a 75MHz DX4, 8MB of RAM, a 455MB hard drive, and 16-bit sound.

Likewise, all five units feature two PC Card slots plus extras once reserved for premium-brand notebooks, such as removable hard drives (the TravelMtate's drive is the exception). Moreover, all of the machines we tested came with 330MB or more hard-drive capacity (except the Z-Star EX, which had a skimpy 200MB). The TravelMtat 4000M packs a whopping 455MB.

Two usability highlights: Both Toshiba's Satellite T2100CS and Zenith's Z-Star EX tuck the AC adapter inside the machine itself. The Z-Star EX's can be removed and swapped with a second battery—a very crafty design we'd like to see other notebooks emulate.

**Lowlights** To our surprise, only the TravelMate 4000M was wired for 16-bit stereo sound. Given the slumping costs of this circuitry, we were disappointed that other notebooks lacked it.

While battery life for budget notebooks was generally good, Broadax's NP7546D managed fewer than 2 hours of charge life in our tests. The Satellite, Z-Star EX, and StepLite all churned out close to 4 hours.

#### Performance: Windows Apps



NOTE: WINSTONE 95 IS A BENCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS. "MODELS TESTED WITH SHEDDING ODERATING SYSTEM THIS LIMIT SHEDDING HATCH WINDOWS.

#### **Performance: Battery Life**



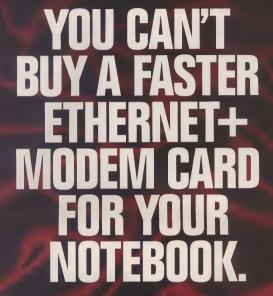
NOTE THE ZOIGIT BATTERY TESTS ELECTRONICALLY SIMULATE COMMON LISER ACTIVITY

#### Rating **Budget** Notebooks

How They Measure Up in Our Lab Tests

Product	Price*	S)	18 18 18	Haro D.	Performance	Usability	Technology	Verdict
TravelMate 4000M Texas Instruments (800) 848-3927 Reader Service No. 741	\$2,299	75 MHz DX4	8MB/ 20MB	455 MB	***** Best power for its class.	**** Small external AC adapter, fair weight and battery life.	**** Big drive, built-in 16-bit stereo sound.	*****  Best performance in its class.
Broadax NP7546D Broadax Systems (800) 872-4547 Reader Service No. 742	\$1,799	66 MHz DX2	8MB/ 36MB	340 MB	**** Splendid speed for a 66MHz 486SX.	** Short battery life and heavy weight hinder ease of use.	*** Big drive and screen, plus LED display.	* * * Hot performer and seductive price.
Satellite T2100CS Toshiba Computer Systems (800) 334-3445 Reader Service No. 743	\$2,099	50 MHz DX2	8MB/ 28MB	330 MB	****Fastest 50MHz 486SX for the road.	***** Long battery life, nice keyboard, 10.4- inch screen, light.	**** Big drive and internal AC adapter.	* * * * High usability for an excellent price.
Z-Star EX Zenith Data Systems (800) 533-0331 Reader Service No. 744	\$1,954	MHz DX2	8MB/ 20MB	200 MB	***Would have tested better bundling Windows 3.11 instead of 3.1.	Long battery life and lightweight.	**** Second battery swaps with internal AC adapter.	*** Faster performance and a bigger drive would help.
StepLite Austin Direct (800) 752-1577 Reader Service No. 745	\$2,420	50 MHz DX2	8MB/ 20MB	340 MB	* * An L2 cache would help.	*** Feathery weight, yet long battery life.	***Better pointer and faster performance would help.	*** Unobtrusive and long lasting—but pricey.







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an Ethernet LAN than

any other PC card."

data transfer, the Xircom CreditCard Ethernet+Modem delivers 40% better performance on 5. "The new network drivers on the CreditCard Ethernet+Modem 28.8 are

compatible with the best-selling Xircom Performance Series CreditCard Ethernet

Adapter Ilps, So you can have one set of network drivers for all of your Xircom mobile users."

6. "The Xircom CreditCard Ethernet+Modem 28.8 is fully SNMP manageable. Which means you can use

9. "Xircom pioneered notebook networking. They really understand the needs and lifestyle of the mobile user. Look around, Xircom users outnumber all others by five to one."

10. "Xircom also makes a blistering fast CreditCard 28.8 modem. The fastest modem money can buy.



Plus you get the same Xircom quality. The same Xircom support. And the same Xircom

# NOW, HERE'S WHAT YOU TELL THE GUYS IN MIS.

2. "Faster by LAN. Faster by phone line, too, The Xircom CreditCard Ethernet+Modem 28.8 features a V.34

modem that's double the speed of its 14.4 predecessor."

3. "The best just keeps getting better. This is the third-generation CreditCard Ethernet+Modern from Xircom, It's fieldproven technology that's won universal acclaim and virtually every

industry



4. "It's easy to set up. The Xircom CreditCard Ethernet+Modem 28.8 comes with its own Windows-based easy-installation software (an enhanced Version 2.0 no less). It also comes

with Delrina's data and fax software."

your standard network management tools (like HP OpenView) to manage and monitor your notebook users while they're on your LAN."

7. "Along with the CreditCard Ethernet+Modem 28.8 comes the Xircom Customer Assurance Pledge. So we'll be able to trade-up the CreditCard Ethernet+Modem 28.8 for newer, faster technology in the future and receive a full 35% discount directly from Xircom."



8, "It comes with a lifetime warranty. It comes with a 30-day money-back guarantee. It comes with free customer support. It even comes with next-day replacement parts. And you can always get in touch with Xircom day or night via their Electronic Bulletin Board or FactsLine or CompuServe."

standards of technical



11. "If you don't believe me, talk to the folks at Xircom yourself. Give them a call at 1-800-438-4526 ext. 52J or visit them on the World Wide Web at Road Warrior Central: http://www.xircom.com."

12. "I really, really want a Xircom CreditCard Ethernet+Modem 28.8 card for my notebook. It's a really good buy. It's a safe buy. It's a responsible buy. If you sign off on it, I won't bug you for anything else again. For two weeks, okay a month. How 'bout a month? I promise."



## **Power and Expandability**

#### **Executive Summary**

Are they desktop replacements or wayfaring power platforms? Both. Workhorse notebooks cover broad territory, from MidWest Micro's bilstering fast 90MHz Pentium-based SoundBook Plus to Samsung's modest 75MHz DX4 Sens700. Prices vary as widely. MPC's TouchNote 775 costs \$2,800, while Toshiba's flagship T4900CT costs \$3,099. The SoundBook Plus earmed our PCC Best award because it's not only fast, it also boasts a big active—matrix screen and huge hard drive.

Because few of us can anticipate the problems we'll need to solve from the road, we lean toward portables that pack the power and functionality of our desktop systems. That's no small order. To qualify as a workhorse notebook in PC Computing's Mobile Superguide, a machine had to feature at least a 75MHz DN4 CPU, 16MB of RAM, and a 300MB or larger DN4 clayer. Of course, we also expected these machines to come with big color screens, business audio, and broad expandability. We weren't disappointed.

Highlights Lest you squander good money on old technology, it's time to acknowledge the Pentium's place in mobile computing. Nearly half the machines in the workhose category feature Pentium CPUs, with the 75M/Hz version the overwhelming favorite. Two 1990s—Broadax's NP7659T and MidWest Micro's SoundBook Plus—make splashy debuts in this roundup. Both systems outperformed the competition by clear magnins, and the 75M/Hz Pentium performance from NEC's Versa P775 and Zeo's Meridian 850C was also impressive. Large hard drives and big, bright displays complement this muscle. Except Altima Systems' Multimedia Virage II with its stingy J40MB drive, all the machines in this category provided between 520MB and 810MB of storage.

Screen sizes ranged from 9.5 inches to 11.3 inches. Austin's Vista uses dual-scan passive-matrix technology, as does Dell's Latitude XPi, MPC's TouchNote



**P90 Takes to the Road:** Meet the fastest notebook money can buy: MidWest Micro's Pentium-based SoundBook Plus.

775, and Zeos's Meridian 850C. Every other machine used thin film transistor (TFT), as reflected in their prices: expect a \$500 to \$1,000 premium.

In terms of battery life, Gateway's Liberty DX4100 was tops, lasting an in-crobled 9 hours and 25 minuses. Lowlights Although the Pentium-based Travel-Mate 5000 from Texas Instruments managed more than 3.5 hours of charge life, thanks to lithium-ion batteries, technology leaders like IBM's ThinkPad 755CE and Toshib's 17400CT lasted a lackluster 3 hours or less.

Also, although feature-rich TFT notebooks weigh more than their budget counterparts, NEC's Versa P/75 (8.7 pounds) and Broadax's NP7659T (8.8 pounds) harken back to the days of shin-banging laptops.

Finally, high usability, rich feature sets, and fast performance are all well and good, but prices for IBM's ThinkPad 755CE (\$5,964), NEC's Versa P/75 (\$5,774), and Texas Instruments' TravelMate 5000 (\$5,149) scem somewhat high when compared with the prices for MidWest Micro's SoundBook Plus (\$4,799).



NOTE: WINSTONE 96 IS A BEINCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS, "MODELS TESTED WITH SHIPPING OPERATING SYSTEM: THIS UNIT SHIPPED WITH WINDOWS 3.1

#### **Performance:** Battery Life



NOTE THE ZOIGIT BATTERY TESTS ELECTRONICALLY SIMULATE COMMON USER ACTIVITY

# Finally, a dog and pony show

require an elephant.





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Attachment. Loaded with

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stereo speakers, it
fills a conference
room with dazzling
sound. It also boasts a 2x CD ROM, a joystick/Midi port, audio lines in and out, and
volume range controls. Snap it onto the
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full-size screen and keyboard, and you've
got a 6-pound, 2"-tall performer working
feats of audio/visual wonder. Sorry, Jumbo.

16-bit audio and

Call 1-800-DIGITAL for your

digital



## Rating Workhorse Notebooks How They Measure Up in Our Lab Tests

Product	Price*	3	The state of the s	Hard Drug	Performance		Usability	Technology	Verdict
SoundBook Plus MidWest Micro (800) 638-7606 Reader Service No. 746	\$4,799	90MHz Pentium	16MB/ 40MB	720 MB	***** Top performer of any notebook.	9	**** Nice palm rests; but heavy load and small keyboard.	*****Big on basics: screen, disk, CPU, plus 16-bit sound.	**** Power users, go no further.
Latitude XPi Dell Computer Corp. (800) 289-3355 Reader Service No. 747	\$4,098	75MHz Pentium	16MB/ 40MB	810 MB	*** Fast, but not the fastest in its class.	9	**** Low weight, large wrist-rest.	****\square Lithium-ion batteries, big screen and drive.	**** Put it on your short list.
TravelMate 5000 Texas Instruments (800) 848-3927 Reader Service No. 748	\$5,149	75MHz Pentium	16MB/ 32MB	772 MB	**** 32-bit disk access would help.	9	****\% Bright display, long battery life.	*****Dual battery packs, big drive, speedy graphics.	* * * * ½  Beats many of the best, but at a higher price.
Versa P/75 NEC Technologies (800) 632-4636 Reader Service No. 749	\$5,774	75MHz Pentium	16MB/ 40MB	809 MB	***** Fast CPU, fast graphics.		***% Pea-size trackball; too much girth.	*****Highly versatile and doubles as a pen PC.	* * * * * ½ Sticker shock? Yes, but it's first-rate.
Broadax NP7659T Broadax Systems (800) 472-4547 Reader Service No. 750	\$3,300	90MHz Pentium	16MB/ 40MB	520 MB	**** Second fastest in its class, thanks to its P90.		*** <sup>1</sup> / <sub>2</sub> Heavy, and trackball is askew.	*** Short battery life, but good built-in multimedia features.	* * * * Blistering performance at a bargain price.
Liberty DX4100 Gateway 2000 (800) 846-5227 Reader Service No. 751	\$4,499	100MHz DX4	24MB/ 24MB	720 MB	*** Big L2 cache helps.		***¹½ Big screen, but scrunched keyboard; best battery life.	**** Spectacular 9.5 hours of battery life.	**** Great, aside from the keyboard.
Meridian 850C Zeos Int'l (800) 554-5218 Reader Service No. 752	\$3,795	75MHz Pentium	16MB/ 32MB	528 MB	****Fast for its class.		***Big passive- matrix screen.	***'s Middle- of-the-road battery life.	* * * * Sizzling performance on a budget.
OmniBook 4000CT Hewlett-Packard (800) 443-1254 Reader Service No. 753	\$4,346	100MHz DX4	16MB/ 32MB	520 MB	*** Needs an L2 cache.		***3 Crisp screen, but heavy machine.	****Floppy drive swaps with second battery.	* * * * Solid constructio fair price.
Slimnote 5100T Twinhead Corp. (800) 995-8946 Reader Service No. 754	\$3,895	100MHz DX4	16MB/ 32MB	800 MB	***\square Bundling Windows 3.11 would increase performance.		*** Small screen, heavy weight.	**** Touch-pad pointer and LED display.	* * * * Solid technology, no-baloney price
ThinkPad 755CE IBM (800) 426-2968 Reader Service No. 755	\$5,964	100MHz DX4	16MB/ 40MB	540 MB	**Slow graphics and no L2 cache.	9	***** Top-notch keyboard, light as a feather.	****Poor battery life, but built-in fax modem.	* * * * Good machine, but wait for a sale.
Toshiba T4900CT Toshiba Computer Systems (800) 334-3445 Reader Service No. 756	\$5,099	75MHz Pentium	16MB/ 40MB	772 MB	**** Squarely middle- of-the-road for a Pentium.	9	**** Excellent keyboard, bright display.	****Big drive, fast graphics.	*** Awfully pricey, no
Ascentia 950N AST Research (800) 876-4278 Reader Service No. 757	\$5,498	75MHz Pentium	16MB/ 40MB	800 MB	**¾ Mediocre performance despite Pentium.	9	**** Lightweight yet packed with power.	**** All the right parts and Pentium power, too.	**** Solid, but pricey.



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#### Rating Workhorse Notebooks

How They Measure Up in Our Lab Tests

Product	Price*	8	The state of	Hardon	Performance	Usability	Technology	Verdict
Vista Austin Direct (800) 752-1577 Reader Service No. 758	\$3,192	100MHz DX4	16MB/ 28MB	810 MB	*** More memory would help.	****Big display, nice pointer.	*** Large drive, medium performer.	**** Uninspiring design but unpretentious price.
Z-Noteflex Zenith Data Systems (800) 533-0333 Reader Service No. 759	\$4,965	100MHz DX4	16MB/ 24MB	809 MB	**¼ Fast graphics, but needs an L2 cache.	*** Small screen, awkward trackball.	***'s Big drive, decent battery life.	* * * ½  Solid notebook, but priced on the high side.
Multimedia Virage II Altima Systems (800) 356-9990 Reader Service No. 760	\$3,355	100MHz DX4	16MB/ 32MB	340 MB	**% An L2 cache would help.	***'s Big palm-rest.	***'s Floppy drive can be swapped with a second battery.	* * Priced to move, but better values abound.
TouchNote 775 MPC Technologies (800) 672-9889 Resider Service No. 761	\$2,600	75MHz DX4	16MB/ 64MB	540 MB	** Slow processor holds up the show.	**** Lightweight, and has cool touch pad.	*** 1/2 Kudos to the LED display, but a bigger drive would be better.	* * * Unimpressive power, but just look at that price.
Sens700 Samsung Electronics America (800) 656-0837 Resuler Service No. 762	\$3,000	75MHz DX4	16MB/ 36MB	540 MB	* Ouch! Slow CPU and no cache.	***Awkward trackball and keyboard.	* * * At least it doesn't weigh much.	* * ½ We'll weit for the upgrade.



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- stereo speakers · 4/8MB standard RAM, expandable to 32MB
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## Presentation **Power**

**Executive Summary** 

IBM's ThinkPad 755CD packs a removable CD-ROM drive, video in and out, as well as an Mwave digital signal processor and telephony in a notebook that's less than 3 pounds. Sure, it's more expensive than some of the other units we tested. But if multimedia presentations are important to you, don't skimp on the fills. And while its performance lagged under Windows 3.1, 32-bit file access should give it a boost under Windows 95.

Pity the poor soul who has to endure another monochrome flip-chart presentation. God gave us multimedia not just to prevent the glazing of eyes, but to sell ideas, to change minds. It's not surprising that multimedia is mobile computing's Holy Grail.

But many advanced features are still a long way off. No notebook comes with an MPEG code yet. Only NEC's Versa M/75TC offers a high-resolution LCD display. And no notebook audio circuitry can compete with desktop models.

Even so, the current generation of multimedia portables makes business presentations come alive. The simplest solutions integrate a CD-ROM drive, 16-bit audio, high-quality speakers, and a 9.5-inch or larger thin film transistor (TFT) color display in the notebook itself.

> Shochorning a 5.5-inch CD-ROM drive into a form factor already crammed to the gills in os small feat. But remember that a CD-ROM drive also cats battery life as if gobbling cocktail peanuts. And while good stereo speakers continue to shrink in size, even the best notebook speakers are timpy, especially at either end of their voice range. To get

around these shortcomings.



Encore: IBM's \$6,349 ThinkPad 755CD is pricey, yet it totes more multimedia technology than any of its competitors.

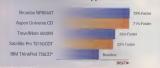
several manufacturers have chosen not to pack these features into the notebook itself. Instead, they load them into portable multimedia docking stations. The typical configuration: a dual-speed CD-ROM drive and larger high-quality speakers—running on a battery- or AC-powered dock. Total traveling weight jumps to the 12-to-15-round rance.

Highlights Top honors for wedging a CD-ROM drive into a portable notebook go to IBM and Toshiba, though their implementations are worlds apart. Toshiba's Satellite Pro T2150CDT features a side-loading, double-speed drive that is slightly faster than IBM's double-speed drive that is slightly faster than IBM's double-speed drive and lasts longer on a battery charge—more than 4 hours. IBM's ThinkPad 735CD, on the other hand, has flexibility and a richer array of multimedia features in its favor. Pop up the keyboard, then swap out IBM's CD-ROM drive for a floppy drive. The ThinkPad also comes with an Mwave DSP that supports 16-bit wave audio and recording playback (it



Weighty Wisp: With its dock, the TravelMate 4000M is 13 pounds but fits on a tray table.

#### **Performance: Windows Apps**



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#### **Performance:** Battery Life



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#### Multimedia Notebooks: Select from Several CD Solutions

also doubles as a 14.4Kbps fax modem and telephone). There's a video-in jack for attaching a video camera, and a video-out jack to play presentations on an NTSC- or PAL-compliant television.

Like Toshiba's Satellite Pro. IBM's ThinkPad features a 10.4-inch TFT color display. Unlike the Satellite Pro, which is powered by a 75MHz DX4, the ThinkPad has a 100MHz DX4, and costs \$6,349that is, \$1,971 more than its leaner counterpart, Panasonic's V41 integrates a CD-ROM drive, but given its high price and heft, the Toshiba and IBM entries are

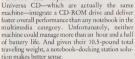
better bargains.



drive, two excellent speakers,

and a mixer control to set audio input. It also outperformed other notebookdocking-station solutions in this roundup. In fact, the 4000M's 75MHz DX4 version without the docking station swept our budget notebook category.

Lowlights Broadax's NP9549T and Aspen's



Wonder Dock: The Z-

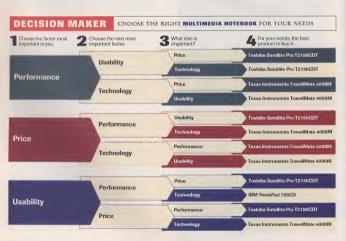
first-rate, but hefty.

Noteflex's docking station is

The Versa M/75TC features a fast double-speed CD-ROM drive, but its overall performance lagged behind most other machines in this category. The Z-Noteflex was a medium performer overall, though its docking station is tops. Alas, its size and weight militate against traveling with it, unless you take a luggage cart.



Easy Reach: You can access the Universa CD's CD-ROM drive at the unit's side



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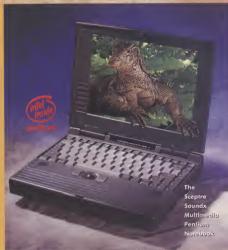
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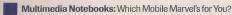


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## Rating **Multimedia** Notebooks How They Measure Up in Our Lab Tests

Product	Price*	3	The state of the s	Hand Only	Performance		Usability	Technology	Verdict
ThinkPad 755CD IBM (800) 426-2958 Reader Service No. 763	\$6,349	100MHz 486DX4	16MB/ 24MB	540 MB	*** 32-bit file access in Windows 95 or Windows 3.11 will help.	9	**** <sup>3</sup> 2 Big screen, great keyboard, so-so battery life.	***** Removable CD-ROM drive, video in and out, Mwave DSP.	****  Don't let the price come between you and this technology leader.
Satellite Pro T2150CDT Toshiba Computer Systems (800) 334-3445 Reader Service No. 764	\$4,378	75MHz 486DX4	16MB/ 32MB	500 MB	**** Faster than some 100MHz DX4 notebooks.	9	***** Long battery life and big screen.	***Fast CD-ROM drive, big screen.	*** Great dollar value for simple needs.
TravelMate 4000M Texas Instruments (800) 848-3927 Reader Service No. 765	\$4,499	100MHz 486DX4	20MB/ 20MB	524 MB	****Can't wait for the Pentium version.	9	**** Smallish screen, decent battery life.	**** Battery- powered docking station remains the best in its class.	*** The extra weight is worth the show.
HiNote Ultra Digital Equipment Corp. (508) 264-6831 Reader Service No. 766	\$4,999	75MHz 486DX4	16MB/ 24MB	351 MB	***'s Fast for its class.	9	**** Slender, with good battery life.	*** CD- equipped docking station is as slim as they get.	*** if you're looking for a lightweight notebook, conside this an ideal choice.
Z-Noteflex Zenith Data Systems (800) 533-0331 Reader Service No. 767	\$5,356	100MHz 486DX4	16MB/ 24MB	772 MB	****Middle of the pack.		* * * * Small screen, heavy.	****Great docking station, but who will want to tote it?	*** Good combination notebook-dock, but you'll need a luggage cart to take it with you
Broadax NP9549T Broadax Systems (800) 872-4547 Reader Service No. 768	\$3,400	100MHz 486DX4	16MB/ 64MB	508 MB	*****The fastest in its class—by a hair.		**Battery life needs help; one of the heaviest units in its class.	*** Double-speed CD-RDM drive is built into the system.	**** 1/2 This is one of the cheapest CD-RDP notebooks you'll find, but, alas, it's heavy.
Panasonic V41 Panasonic Personal Computer (800) 742-8086 Reader Service No. 769	\$7,399	75MHz Pentium	16MB/ 32MB	640 MB	*** Despite its Pentium, performance lags.		*** Floppy drive swaps with battery; but 10 pounds is a lot to carry.	*** Long battery life and integrated CD-RDM drive with unit, but weak audio.	***½ Top-notch performance, but heavy and expensive.
Jersa M/75TC NEC Technologies 800) 388-8888 Reader Service No. 770	\$3,374	75MHz 486DX4	16MB/ 40MB	340 MB	**Poor performance, even when tested with Windows 3.11.	9	****Big, high-resolution screen; floppy drive swaps with battery.	****No integrated CD-ROM, but solid docking station.	*** ½ Need more power and less weigh
Jniversa CD Aspen Computer 800) 472-3273 Render Service No. 771	\$4,220	100MHz 486DX4	16MB/ 64MB	520 MB	***** Almost the fastest in its class.		** Fleeting battery life and very heavy.	*** Integrated double-speed CD-ROM drive.	* * You'll be better off gettin its less expensive, slightly faster (but equally heavy) twin Broadax's NP9549



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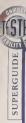
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### **The Most Usable Pointing Device**

Notebook manufacturers, try as they might, can't please the stubborn fingers of businesspeople who take to the road. All manner of bizarre technologies and cockeyed placements of notebook pointers have come and gone (to everyone's great relief). A few still surface—almost in comical surprise. But everyone hates them.

Is consensus possible? Slowly, with great resentment and exasperation, mobile businesspeople have come to settle on three technologies: the now-familiar center-mounted trackball, the joystick-inspired "eraser-head" pointing stick, and, most recently, the center-mounted touch pad. As our Usability Labs discovered, these technologies are winning mind-share not because they're great answers, but because they're the least offensive of the attempted remedies.

We tested the three pointing-device technologies using WinBook Computer's WinBook XP notebook, which provides all three pointer options. We asked testers to evaluate them while working with routine letters in a word processor, spreadsheets, and a little covert game of solitaire. We'd hoped to find a runaway winner, but alas, fingers are prejudiced animals that don't easily yield to others' ideas of usability.

Each type of pointer has its admirers and detractors. Some testers thought the new touch pad was the greatest idea since the GUI was invented. Others loved the pointing stick's compact configuration—an asset for a cramped notebook keyboard. When we crunched the final numbers, however, the trackball landed on top—although none proved satisfactory enough to earn our Usability Seal of Approval.

Task	Trackball	Touch Pad	Pointing Stick			
1. Word Processing Weighting: 40%	***Accurate and quick, until you have to click. Can be a bit sensitive when highlighting text.	***Easy to get to the text, but dragging with this device is a drag.	***It's difficult to make the cursor slow down for cut-and-past functions.			
2. Spreadsheet Weighting: 40%	* * * 3 Cell formatting is precise and quick because you can control the trackball easily with your thumb.	** * Testers kept encountering cell-formatting errors that resulted from click-and-drag actions.	***Two-handed control isn't always better than one. This point is sluggish.			
3. Solitaire Weighting: 20%	*** Moving cards is awkward: It requires a certain knack and involves multiple hand movements.	***This one is a little too slow for playing-card aficionados.	****Anah, those PacMan joystick memories.			
Verdict 100%	* * * ½ Easiest to use, but sometimes cramped to operate—finger yoga required.	***As easy as finger painting, but takes a bit of time to get used to.	*** No need for your hands ever to leave the keyboard.			

#### **Trackball**

Thanks to the wast popularity of Apple's PowerBooks, most of the loonier schemes for pointing-device placement are now history. Centering a 16mm or larger ball below the keyboard earns near-emiversal approval, and it's a feature you'll find on most notebook.

Pros: Familiarity breeds ease of use. Since trackballs have been around the longest, our testers found them the most comfortable to use, quickly becoming productive with them. Testers sang the praises of easy cursor control and manipulation—it was by far the easiest and most accurate of the devices to use.

Cons: Yes, they liked the ball, but mouse buttons are another matter. Cramped spacing between the ball and buttrons means claustrophobia for the hands, turning some operations into a dexterity nightmare. On the other hand, fast typists found too much distance between ball and buttons to be a hindrance.

#### **Touch Pad**

No, it's not an Etch-A-Sketch beneath the keyboard, it's the newest pointer on the block: a 2-inch touch-sensitive block that functions as both pointer and mouse buttons. Like all new technologies, it requires some adaptation—but not as much asyou'd think. Simple and straightforward, the touch pad lies flat at your fingertips. Touch it. Sweet. Look for it on the Apple PowerPooks and MPC Touch Note portables.

**Pros:** The touch pad lets the pointer and mouse buttons become one. This aspect frees the user to focus on the task instead of the technology.

Cons: Unless you're Michelangelo, your fingertip is not an exact pointing device. You experience a certain lack of control when editing text or formatting spreadsheets, and the learning curve for click-and-drag operations is significant.

#### **Pointing Stick**

When it appeared three years ago, IBM's TrackPoint II—a hot, red joystick in the middle of the keyboard—raised quite a few eyebrows. Another gimmick destined for the freak show of dead portable pointing devices? Hardly, Today it's a common pointing tool used on high-profile portables such as Toshiba's Portégé and IBM's ThinkPad.

Pros: Some testers liked the TrackPoint so much that they dreamed of a day when their desktops came with this mouse killer. Why? You can manipulate the pointer without moving your hands from the keyboard. Fast typists find it enhances efficiency.

Cons: Location, location, location. On the slowest cursor speed, accuracy in positioning the beast is frustrating. Testers sometimes expected the mouse buttons placed below the space bar to be the actual space bar.



"Using this device with a single hand is overly strenuous on people with hand problems. At present, it is . . . a two-hand device that requires [each hand] to reach in an awkward position."



"The cursor moves as you take your finger off the pad. This ends up with you missing your target—that is, a word, a cell . . . ."
ENGINEER



"It was difficult to set the correct speed—the cursor moves too slowly across the screen, but too fast over the point [where] you want to be."

SALES FRECUTIVE

## **Card**-Carrying Capacity

Getting a PC Card to work with your notebook can be as much fun as a visit to a proctologist. Infurating incompatibilities still beseige the PC Card standard. Even today many notebook makers furnish lists of cards known to work with their portables, hoping to scare customers away from purchasing peripherals that will only drive up their technical-suport phone costs.

What happened to PC Card technology? Envisioned as a nonproprictary, industry-standard expansion bus for portable PCs, it has found itself poorly implemented, too broadly interpreted, and technically unfinished. Worse, even when they work, today's PC Cards straffic data in relatively slow 16-bit spoonfuls, It's no wonder that many businesspeople simply ignore PC Card peripherals rather than fuss with their shortcomings.

New and Improved? Now comes CardBus, a 20MHz, 32-bit, revised version of the standard that promises wider compatibility and faster performance (via a PCI local bus). Also, Plug and Play has entered the picture. With Windows 95, installation headaches may soon be a thing of the past. Is the PC Card interface finally getting its act together?

Yes—and no. CardBus-compliant notebooks won't arrive before the end of this year—at the earliest. And as *PC Computing*'s Usability Labs discovered, implementation of Plug and Play varies widely among PC Card peripherals.

Of the 50 PC Cards we tested, all installed eventually, but 11 required us to fuss with driver updates or configuration file settings. Depending on the brand of notebook you own, however, the cards that gave us trouble may very well install and work in your machine without a hitch. Otherwise, you might be forced to fuss with device drivers, which not only use up a lot of RAM but also can conflict with other memory-resident utilities.

Safe Bet It's not fair to summarily condemn the technology, however. For example, our rests showed that most PC Card modems now offer wide compatibility. All 19 of the high-speed modems in our roundup passed with flying colors. Also, all three PC Card hard drives installed with no problems at all—an envisible accomplishment.

Network adapters were another matter. Six (of 15 cards we tested) failed out-of-box compatibility tests. Two of the four SCSI adapters failed. And most disappointing of all were sound cards: Only two of the five we tested installed without a snae.

Is there a silver lining to all of this? Yes, the cards that install properly also install quickly. And they 're as feature-rich as many desktop peripherals: 28.8K bys fax moderns that are cellular ready; modern-Ethernet combo cards; sound cards with 4-likFt z sampling; 170MB or larger hard drives; fast SCSI-2 controllers—even moderns that attach to ISDN lines.

True Plug and Play for PC Cards won't arrive for at least a year. Performance also lags. Card Bus-compatible notebooks are about six months away, but peripherals that take advantage of their fast, wide data path won't appear before late 1996. Meanwhile, installation headaches are receding. If you're willing to risk the trouble, you can tote around an awful lot of functionality in the size of a credit card.



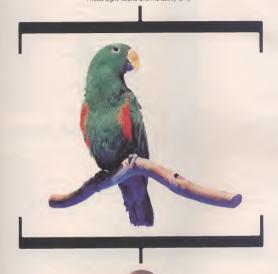
Locked and Secure: Not only is Cardinal Technologies' 28.8 Fax/Modem fast and inexpensive, it also comes with a crafty locking mechanism for securing the phone line to the card without adding any additional bulk or weight.



Room to Spare: Who'd have thought you could pack so much data on a device this small? You get lots of storage for little cash. Better still, installation of Epson's 170MB Hard Disk Card Type III hard drive was easier than adding a second drive to a desktop system.



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#### Rating **Modems**

Product	Price*	Verdict	Product	Price*	Verdict
28.8 Fax/Modem Cardinal Technologies, (800) 775-0899 Reader Service No. 772	\$299	* * * * * Quick, with V.34 and V.FC support.	DataRex 14.4/14.4 Data/Fax Modem Kingston Technology Corp., (800) 435-2620 Reader Service No. 787	\$200	* * Gets the job done-slowly.
28.8 PCMCIA Modem Megahertz Corp., (800) 527-8677 Reader Service No. 773	\$350	**** Fast, cellular support, and no dongles.	Fax/Modem Card Cardwell Int'l (916) 985-1880 Reader Service No. 788	\$179	* * ½ Sluggish; so-so usability.
Noteworthy 28.8/14.4 Cellular Ready Data Fax Modem Toshiba, (800) 334-3445 Resider Service No. 774	\$399	****½ Cellular support in a rippin' fast package.	ST2814 Fax/Modem Smart Modular, (800) 536-1231 Reader Service No. 789	\$399	* *1/2 Speedy, but usability is dismal.
Courier V.34 U.S. Robotics, (800) 342-5877 Reader Service No. 775	\$575	***  Cellular-ready, excellent manual, V.34 and V.FC support.	Fax/Modem Smart Modular, (800) 536-1231 Reader Service No. 790	\$449	*½ Slow and proprietary to Hewlett Packard's 100LX and 200LX.
FM28.8 Fax/Modem ActionTec Electronics, (800) 797-7001 Reader Service No. 776	\$459	*** Zippy, with high usability.	Rating <b>Network</b>	Ada	apters
Optima 28.8	\$499	* * * Fastest	Product	Price*	Verdict
Hayes, (800) 665-1259 Reader Service No. 777  V.34 Cellular Data Fax/Modem	\$329	modem you can carry in a shirt pocket.	PCMCIA Ethernet Megahertz, (800) 527-8677 Reader Service No. 791	\$150	* * * * Solid usability and compatibility.
Eiger Labs, (800) 653-4437 Reader Service No. 778		Solid speed and no-nonsense usability.	CreditCard Ethernet psII Xircom, (800) 438-4526	\$159	* * * Easy
KeepInTouch Express Data/Fax Modem AT&T, (800) 482-3333 Reader Service No. 779	\$209	* * * Quick performer and easy to use.	Reader Service No. 792		compatibility, two connection types.
Mobile Plus Cellular Data/Fax Modem Apex Data, (800) 841-2739 Reader Service No. 780	\$220	***  The complete works and fast to boot.	Combo PCMCIA EtherCard Linksys, (800) 546-5797 Reader Service No. 793	\$139	*** Passed the basics; supports two connection types.
MultimodemLT Data/Fax Modem Multi-Tech Systems, (800) 328-9717	\$299	*** Fast, with good documentation,	Ethernet PCMCIA Adapter Olicom, (800) 265-4266 Reader Service No. 794	\$159	**** Manual and hardware didn't match.
PhoneWorks To Go Connectware, (800) 357-0852 Reader Service No. 782	\$179	but poor connector.  ********** Lethargic, but solid usability; has voice, too.	LiveWire New Media, (800) 453-0550 Reader Service No. 795	\$179	*** 2Good usability, but will connector last?
ProClass 28.8 PCMCIA with EZ-Port Practical Peripherals, (800) 442-4772 Reader Service No. 783	\$459	**** Pop-out jack, but poor manual; and where's the cellular support?	10Base-T; 10Base2 Silicom Connectivity Solutions (800) 474-5426 Reader Service No. 796	\$229; \$259	* * Feature-rich, but installation gave us trouble.
SafeJack 28.8 V.34 Fax/Modem Angia Communications, (800) 877-9159 Reader Service No. 784	\$375	* * * 1/2 Speedy, but where's the cellular support?	EtherLink III PC Card 3Com Corp., (800) 638-2666 Reader Service No. 797	\$248	* * Tricky installation, but supports two connection types.
Sportster PCMCIA U.S. Robotics, (800) 342-5877 Reader Service No. 785	\$499	*** Basic package for easy use.	Ethernet LAN Cardwell Int'l, (916) 985-1885 Reader Service No. 798	\$149	*** Poor installation, but two connection types.
TravelCard 28.8P Microcom, (800) 822-8224 Reader Service No. 786	\$299	* * * * 2 Speedy?  Sure, but will delicate connector break?	ETherRx Kingston Technology, (800) 435-2620 Reader Service No. 799	\$150	** * Tough to install; cellular support.

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## Rating Network Adapters Continued

Product	Price*	Verdict
LAC-CD021 TDK, (800) 999-4835 Reader Service No. 800	\$159	* * Ho-hum performance on all fronts.
SocketEA (10Base-T) Socket Communications, (800) 552-3300 Reader Service No. 801	\$159	** * Average card, but needs manual driver installation.
SocketEA+ (10Base-T and 10Base2) Socket Communications, (800) 552-3300 Reader Service No. 802	\$179	** t works, but not easily.
PCMCIA 10Base-T; 10Base -T/2 Eiger Labs, (800) 653-4437 Reader Service No. 803	\$119; \$159	* * ½ Problems with installation.
TCS141-T Ethernet 10Base-T; TCS141-2 Ethernet 10Base2 Thomas Conrad, (800) 332-8683 Reader Service No. 804	\$225; \$199	**½Too hard to get up and running.
Ethernet Adapter Apex Data, (800) 841-2739 Reader Service No. 805	\$130	* * Difficult setup.

## Rating Combo Cards

	Product	Price*	Verdict
PI	CreditCard Ethernet + Modem II Xircom, (800) 438-4526 Reader Service No. 806	\$569	* * * * ½ Combo card supports two net connections.
	Jack of Diamonds Trumpcard V.34 Ositech, (800) 563-2386 Reader Service No. 807	\$690	*** Fast combo card; decent usability.
	Ethernet-Modem Megahertz, (800) 527-8677 Reader Service No. 808	\$395	***Solid network installation; lethargic modem.
	MultiCard	\$399	*** Secure

## **Rating Hard-Drive Cards**

nnections, but slow

ability, true

Pro	oduct	Price*	Verdict
PCC	170MB Hard Disk Card Epson America, (800) 289-3776 ex.3000	\$439	* * * * ½  Good usability, Plug and Play.

\*ESTIMATED STREET PRICE.

Reader Service No. 809

## Rating Hard-Drive Cards Continued

Product	Price*	Verdict
NoteDisk 105MB New Media Corp. (800) 453-0550 Reader Service No. 810	\$429	* * * True Plug and Play, excellent manual.
130MB Hardrive Simple Technology, (800) 367-7330 Reader Service No. 811	\$339	* * Super easy installation, true Plug and Play.

Simple Technology, (800) 367-7330  Reader Service No. 811	\$339	installation, true F and Play.
Rating <b>Sound C</b>	ards	5
Product	Price*	Verdict
PCMCIA Sound Card Media Vision, (800) 845-5870 Reader Service No. 812	\$249	* * * * Identi to Eiger Labs' card, but more bundled software.
PC Card Audio Adapter Eiger Labs, (800) 653-4437 Reader Service No. 813	\$239	*** Solid sound, shrewd installation, but only 20-voice FM.
.WAVjammer New Media Corp., (800) 453-0550 Reader Service No. 814	\$225	* * * 2 Excell sound, but installa is a pain.
Audio Advantage Turtle Beach Systems, (800) 645-5640 Reader Service No. 815	\$129	* * ½ Wave-ta MIDI, but only mo tough installation.
SoundGear Connectware, (800) 357-0852 Reader Service No. 816	\$209	**½ Unimpressive sou difficult to install.

.WAVjammer New Media Corp., (800) 453-0550 Reader Service No. 814	\$225	*** ** Excellent sound, but installation is a pain.
Audio Advantage Turtle Beach Systems, (800) 645-5640 Reader Service No. 815	\$129	₩ ₩ ½ Wave-table MIDI, but only mono; tough installation.
SoundGear Connectware, (800) 357-0852 Reader Service No. 816	\$209	***2 Unimpressive sound, difficult to install.
Rating SCSI Car	ds	
Product	Price*	Verdict
SlimSCSI Adaptec, (800) 959-7274 Reader Service No. 817	\$229	* * * * Breezy installation; works like a charm.
C Adaptec, (800) 959-7274	\$229	installation; works
Adaptec, (800) 959-7274 Reader Service No. 817  Bus Toaster New Media Corp., (800) 453-0550		installation; works like a charm. *** Easy installation, but some
Adaptec. (800) 958-7274  Kealer Service No. 817  Bus Toaster New Media Corp., (800) 453-0550  Reader Service No. 818  SCSI-2 SCSI-2 Simple Technology, (800) 367-7330	\$209	installation; works like a charm.  *** Easy installation, but some tinkering required.  *** Fast, but not flawless



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While each Meridian product is distinct, they all have several hot features that add to their impressive speed and ease of use including local bus video; a comfortable palm rest with an integrated TruePoint pointing device; and an 84-key keyboard.

## Meridian 400 Subnotebook



"ZEOS is out to prove that good things do come in small packages with its Meridian 400C subnotebook," reported Windows Magazine.

At 3.9 pounds, the Meridian 400 is molded with a special carbon-fiber material that cuts weight and improves durability. And with a DX4-100 MHz processor standard, hard drives to 350MB, and RAM that's user upgradable to 20MB, this notebook is "faster than a speeding desktop," as Computer Shopper said.

The 400 features active and dual-scan color screen options. You also get two Type II PCMCIA slots and an external ultra-light 35" 1.44MB floppy drive (included in Packaess 2 and 3).

## Meridian 800 Notebook



"The 800C notebook offers sleek styling, solid construction and hot performance....one of the fastest notebooks we've ever tested," said Windows Magazine.

At 6.3 pounds, the Meridian 800 full-size notebook is light enough to travel anywhere yet it's large enough to use for presentations and everyday computing. With its standard DX4-100 MHz processor, removable hard drives to 528MB, and RAM that's user upgradable to 20MB, this notebook is the raciest thing around.

For your viewing pleasure, the 800 is available with your choice of color displays—a whopping 10.3" dual scan or 9.5" active. You also get two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy drive.

## Meridian 850 Notebook: Pentium Processor Power

Ultimate horsepower that takes the checkered flag! The Meridian 850 gives you supreme Pentium processor performance in a bundle weighing

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only 6.8 pounds. It's light enough to race around the world with you vet it's powerful and fast enough for the most demanding computing.

For turbo power, the Meridian 850 comes with your choice of 75 MHz or 90 MHz Pentium processor, user upgradable RAM to 32MB. 256K synchronous SRAM cache, and a removable hard drive to 1.3GB.

For the best viewing, the 850 is available with your choice of color displays—a mammoth 10.3" SVG4 (800 x 600) dual scan or 9.5" VGA active matrix. You also get 16-bit stereo sound through audio jacks (Sound Blaster Pro compatible) for the best in portable multimedia, two Type II or one Time III PCMCIA slots, and an internal 3.5" 1.44MR floppy

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Pa	ckage 1		Pa	ckage 2		Pa	ackage	3
DX4-100	400C \$2195	800C \$2495	DX4-100	400C \$2495	800C \$2695	DX4-100	400C (N) \$2795	800C
	d drive 5" 1.44MB floppy dri indows for Workgrou		> 8MB RAM > 350MB IDE hard > 35" 1.44MB flopp 400: External, 80 - Custom nylon car > MS-DOS 6.2, Winc > MS Works	y drive. D: Internal rying case	s 3.11	➤ 8MB RAM ➤ IDE hard drive. ➤ 35" 1.44MB floy 400: External, 8 ➤ 14.4 PCMCIA ➤ Custom carryin 400: Leather, 88 ➤ Extra battery ➤ MS-DOS 6.2, Wi ➤ MS Works	ppy drive. 800: Internal <b>A fax/modem</b> ag case. 90: Nylon	
Pentium" F 75 MHz 90 MHz	Processor	850C \$3295 \$3495	Pentium™ Pi 75 MHz 90 MHz		850C 83795 \$3995	Pentium™ F 75 MHz 90 MHz	Processor	850C (NI \$4195 \$4395
➤ 528M IDE hard ➤ Internal 35" 1.4 ➤ Integrated 16-bit	i4MB floppy drive it stereo sound indows for Workgroup		➤ 16MB RAM, 256K ➤ 810MB IDE han ➤ Internal 35" 1.44 ➤ Integrated 16-bit ➤ Custom rylon case ➤ Extra battery ➤ MS-D08 6.2, Win ➤ MS Office Pro	I drive MB floppy drive stereo sound rying case		> 16MB RAM, 256 > 1.3GB IDE has > Internal 35" 1.4 > Integrated 16-b = External ampli > 14.4 PCMCIA > Custom nylon c = Extra battery > MS-DOS 6.2, W > MS Office Pr	rd drive f4MB floppy drive f4MB floppy drive fit stereo sound fled speakers A fax/modem farrying case indows for Workgro	

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- ➤ IDE upgradable HDD. 400: to 350MB, 800: to 528MB, 850: to 1.3GB.
- ➤ PCMCIA slots, 400: 2 Type II, 800 & 850: 2 Type II or 1 Type III.

- ➤ Local bus video with 1MB video RAM. Display: Color VGA backlit LCD, up to 256 colors.
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Life for the mobile professional is just one frustrating compromise after another, right? Claustrophobic window seat or watch-your-elbows aisle. Rubber chicken or 1-can't-believe-that-was-ever-a-cow steak. Not a cab in sight, or a taxi driver who's scarier than Robert DeNiro on a bad day.

But when it comes to the computer you lug on the road, you truly can have all the comforts of home or office. From high-fidelity speakers to highcapacity storage, from persuasive presentation peripherals to total telecommunications tools, you'll find portable alternatives for every facet of your mobile-computing needs. And you don't need to double your budget just to take it with you; many of these items will serve you just as well from your desktop as from your tray table or hotel room.

When choosing products for your totable toolkit, light weight and rugged construction are mandatory. And since there's no one around to help you out at 2 a.m. in Topeka, Kansas, top-notch usability is even more important on the road than it is back at the office.

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port, a spacious screen, and a tiny QWERTY keyboard that distances this device from the keyboardless PDA competitors that kept Doonesbury fans in stitches.

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Points Well Taken: Unlike other pointing devices that you have to leam to roll, slide, or wiggle. Logitech's TrackMan Voyager (top) and Cirque's slim GlidePoint are streamlined ergonomic wonders that fit even the most cramped quarters. The GlidePoint fits comfortably in your hand and needs only a sliver of real estate. The TrackMan, which snaps neatly onto the side of your notebook, has a fine, genlike construction that makes it feel like a precision instrument. It works like one too.

GlidePoint / Cirque Corp. / (800) 454-3375 / \$75 est. street price / Reader Service No. 822

TrackMan Voyager / Logitech / (800) 231-7717 /569 est. street price / Reader Service No. 823



Heads Up: If you buy into the notion of six degrees of separation—that everybody on the planet has some relationship to everybody else via a handful of friends of friends—you probably think twice before pulling up that confidential business plan on your notebook. Next flight, from your highly exposed seat in 12D, dim down your screen and slip on your Virtual i–glasses headset to work in total, and ergonomically correct, privacy.

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Wittal I-glasses Virtual-O/(800) 648-3759 /
5750 est. street prior /
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No. 82.4

Set This Scanner on Stun: Some products are useful. Others are just plain cool. This one is both. Most of us end up jotting down or retyping little snippets of information all day long. But armed with this lightweight and sleek DataPen wand and its bundled OCR software, you can suck text and numbers into your PC anyplace with abandon. DataPen/Pimes Exercines/(80)38-3993/

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It's Show Time! Wherever you're headed, a standard slide projector will surely be there, right? So why drag around a heavy, fragile LCD panel for presentations when you can tote a 1-pound gizmo instead? The sleek PocketPro Presentation System (bottom center) slides into any standard Kodak slide carousel. where your notebook's output is projected at 640-by-480 grayscale resolution. For smaller groups, PC on TV connects your notebook's VGA output to any TV, yielding flickerfree output (bottom right). And don't forget the impact of a presentation with decent sound. If your notebook's built-in speakers leave something to be desired-like fidelity-a pair of portable ones will give you the audio edge: Try Bose's MediaMate Computer Speakers (bottom left), which can mix two sound sources; or AT&T's petite but powerfully integrated Loudspeaker/ Microphone Peripheral (top center), which hides a directional mike inside one of the speakers. Axonix's ProMedia Player (top right) and Altec Lansing Multimedia's AMC2000 Portable Multimedia Center (right center) put everything you needsound output, a double-speed CD-ROM drive, and speakers-in a single portable PC Card package.



PocketPro Presentation System / Kopin Corp. / (800) 983-080 / \$1,985 list / Reader Service No. 826 PC on TV / SuperComputers / (800) 758-7520 / 5284 est. street prior / Reader Service No. 827 MediaMate Computer Speakers / Bose / (800) 484-2673 / 5239 list / Reader Service No. 828 AT&T Loudspeaker/Microphone Peripheral /
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The Verifiest Drass Country v2.0 test simulates typical executive use of Microsoft Office\* applications in Microsoft Windows\* 3.11 during an ampliant higher lower management was analysed and SME TAM was manifed Verifies, in: a located in Santa Micros, SA Promotional princing is not decountable. "Consumitate available in the U.S." of the requisited was regulated above. Deli Buttable systems purchased after the RIGHS\* for a complete copy of our bisensettes or consumer analysis.

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Virtual Workplace / AT&T / (800) 979-4242 / \$6,180 est. street price / Reader Service No. 832

Pocket-size Printers: How many times have you been far away from your office and needed to print a document or revise an overhead transparency? Two new tiny traveling printers make it easy; Pentax's Pocketlet (top) and Citizen's PN80. Both about the size and weight of a notebook battery pack, they can churn out up to three pages per minute at 300 dpi and two pages at 380 dpi; respectively.

PocketJet / Pentax Technologies / (800) 543-6144 / \$429 est, street price (letter only), \$479 est, street price (legal) /



Back Home Again: You thought you were getting pretty good with that "eraser-

head\* pointing device and even learning to like it—until you sat down at your desktop keyboard, that is, and had to relearn how to use a mouse. Using Lexmark's Classic Touch Keyboard with Integrated Pointing Stick, you don't have to strain your brain to toggle back and forth between notebook and desktop input modes. And for a mobile storage solution that's equally at home at home, lomega's Walkman-size Zip drive (left, available in both parallel and SCSI versions) crams 100MB onto floppy-size cartridges.

Classic Touch Keyboard with Integrated Pointing Stick / Lexmark Int'1 / (800) 438-2468 / \$129 list / Reader Service No. 835

Zip / lomega / (800) 697-8833 / \$199.95 list (\$C\$I and parallel); \$19.95 list (Zip disks) / Reader Service No. 836

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AIRPLAY KnMI Becomes (2000 44-238) /







Lighten Up: Most airlines' overhead seat lights do a fine job—of illuminating the armrest. To shed more light on your mobile work space, try ASF's NCL 480 notebook computer light. Clipped to the top of your notebook's screen, it's a boon for hunt-and-peck typists who need to light up the keyboard, not just the screen, (Its electrical contacts are partially exposed, so keep an eye on your Diet Coke when the going gets choppy.)

NCL 480 / ASF Associates / \$49.95 est. street price / (800) 771-3800 / Reader Service No. 838

Wonder Watches: Need to check on that important appointment, anniversary, or to-do list? It's simple with Times's Data Link (fiar left) strapped on your wrist. Its Indiglo night light makes it easy to read in the dark, and its software lets you download data from your PC painlessly. Want to stay in constant touch from gar? Unlike pagers, which can be bulky—and geeky—Seiko's Message Watch is an elegant and useful way to get Dow Jones info, sports updates, and more.

Data Link, Times. (1900) 387-8483 / 5 100 est, street price/

Message Watch / Seiko / (800) 458-5600 / \$100 est. street price /

Reader Service No. 840



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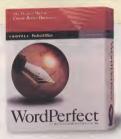
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WordPerfect\*

## The **Ultimate** Web Browser

## SYNOPSIS

NCSA MOSAIC: Once the only game in town, the new beta we tested falls short. 154

## NETSCAPE NAVIGATOR:

This rising star is our testers' favorite. 155

## QUARTERDECK MOSAIC:

A strong showing, even in a heta version, 156

## CALIFORNIA SOFTWARE

INTERAP: Ready to compete with the hest. 159

USABILITY RESULTS: How good are they? 160

FINAL ANALYSIS: What to look out for. 162

DECISION MAKER: Which Web browser is best for you? 162

o what's the big deal? Why is the World Wide Web suddenly the hottest thing since *caffe latte*? After all, it's been around since 1989. So why is everyone just now taking notice? The answer is simple: Web browsers. Until the introduction of the original Mosaic, the first Web browser software, there was no easy way to navigate the

Web. Mosaic was the breakthrough, opening up the graphical side of the Internet with point-and-click access to the vast libraries of linked documents and downloadable files available on the Web. And these browsers make the Web more addicting than channelsurfing on your TV. Since Mosaic's introduction, new Web browsers have been sprouting up almost as fast as we can test them.

We put four Web browsers to the test in PC Computing's Usability Labs: NCSA Mosaic, Netscape Navigator, Quarterdeck Mosaic, and California Software InterAp. We turned selected PC Computing readers loose on the Web with each of the browser applications. Using a 28.8Kbps dial-up connection through CompuServe, testers attempted to navigate among various Web sites, search for specific information, and download a variety of files. They were asked to configure each Web browser to handle sound and full-motion video files. We also asked testers to save certain Web addresses as bookmarks, making it easier to return to those sites later.

Today's Web browsers are loaded with new features. Implementations vary, but persistence pays-with a bit of effort you can do some amazing things. In fact, you may soon be using the Web to order shirts, buy stocks, and sample CDs. Web browsers have turned an obscure and confusing global network into an effective-if not yet efficient-means of communication and commerce.

The Web is certainly captivating. While each of the products we tested has its shortcomings, any of them has what you need to get started. Don't wait. Choose the one that best suits your working style and you won't regret it.

JUST THE FACTS: If graphics slow you down, they can easily be disabled from Netscape Navigator's option menu.

THE VETERAN: Once the only name in Web browsers. NCSA Mosaic is now facing some tough competition.

PICK AND CLICK: If you like to

choose your destinations from editable menus of Web sites, Quarterdeck Mosaic makes it easy.

AS YOU LIKE IT: Customization is California Software InterAp's forte, and you'll love its easy Bookmarks, too.

BY ADAM MEYERSON



## NCSA Mosaic: Where It All Began

Mosaic, the first commercial Web browser, originated at the National Center for Supercomputing Applications (NCSA). It was created by a group of University of Illinois students in their spare time. The students intended to market their brainchild, but the school had its own plans for

Mosaic, so the story goes, and the two parted ways. Today NCSA still markets Mosaic, although it's also licensed to other companies such as Prodigy and



Save Your Site: It's easy to save the current site to NCSA Mosaic's Hotist using either the button bar or Navigate menu, but sites entered manually aren't saved by default. Because users are not prompted to save these entries, testers lost sites they thought they had saved.

Microsoft, which will offer it on their online services.
We evaluated a beta release of NCSA Mosaic 2.0.

NCSA Mosaic achieves the primary goal of a Web prowser—it gets you from her to there. And once there, one click on the Save to Hollist button records that address for future visits. But NCSA Mosaic falls short when it comes to managing the Hollist. As you traverse the Web you'll likely find scores of locations worth remembering, which makes for a very long Hollist. Imagine having the entire contents of your hard disk displayed in a single directory. While NCSA Mosaic offers a familiar folder-within-folder directory structure, our testers found it difficult—if not downright impossible—to create subcategories and to move and telegrents.

A well-designed Web browser can be customized to match your working habits. While our testers did eventually get NCSA Mosaic configured, Help didn't help them. They thred of fruitless searches and simply resorted to trail and error. Worse yet, NCSA Mosaic's Help resides on the Web, so if you can't connect, you have no access to it. How do you call for readside

Vacant Service VV Serv

Put It on My Tab: NCSA Mosaic's tabbed dialog boxes are tidy, but our testers found configuring its MPEG viewer confusing.

NCSA Mosaic for Windows		
General Viewers Ser	vices   Proxy   Tables   Anchor	
Toolbers at Startup  Show Toolber  Show Location Bar	Inine Images  Display Inine Images  30 Reeders	
Show Status 8ar	Background Color	

**Welcome Home:** Although it's buried amid other preference menu options, setting up a new home page is easy.

Lab Notes
Usability testers
were frustrated with
Mosaic's slow Web-

based help system. What Testers Said

About NCSA Mosaic
"If you know the name of a
site, it's very easy to locate.
Without exact spelling, it
can be impossible to

access any site."
TECHNICAL SUPPORT
REPRESENTATIVE
"I like the option of setting

up folders of Hotlists."

SYSTEMS

ADMINISTRATOR
"Hotlists could have been
easier. It did not make sense
to have the Create Hotlist
function in a window

separate from the Hotlist browser." TECHNICAL SUPPORT REPRESENTATIVE

assistance if your cellular phone is locked in the car? NCSA Mosaic's overall usability fell short of the competition. It excels at simple navigation, but can be clumsy and frustrating at housekeeping chores. NCSA Mosaic 2, but release 4 Nisional Center for Superconquing Applications (2) 17324-0072 Free, advantaged to the competition of the competition

and s	Accessing Web Sites	Customizing the Browser	Retrieving Information
Satisfaction	Not difficult, but takes some getting used to.	Does the job, but configuring viewers is frustrating.	Download procedure is unclear and clumsy.
Productivity	It does the job adequately.	Took a bit of guesswork.	Half of our testers couldn't do it.
Help System	Not much help was needed.	Help was available only on occasion.	If you can sall it Help.
Verdict	***	***	***

\*\*\*\*\*Excellent \*\*\*\* Good \*\*\* Acceptable \*\*Poor \* Unacceptable

## Netscape Navigator: Browser of Choice

Been there. Done that. The creators of Netscape Navigator have experience on their side. Their first Web browser, Mosaic (now marketed by NCSA) made the World Wide Web a household word. Now they're taking the Web by storm with a brand-new offering.

Our usability tests found Netscape Navigator to bein a word—easy. Easy to navigate, easy to customize, and easy to manage. But while ease of use may be



Netscape's Little Helper: Navigator's MPEG configuration is hidden under Helper Applications in the Preferences dialog box. Our testers were divided over the difficulty of configuring an MPEG viewer.

appealing, particularly to Internet newbies, Navigator does have its weaknesses. Our testers were unanimous in their complaints that during downloads, Navigator didn't keep them well informed. Furthermore, when they did receive feedback it wasn't accurate.

Ścill, when we asked which product they preferred among all those tested, 55 percent of our testers chose Navigator. Why? For starters, it has all the basic features you'd expect in a browser. Enter a Universal Resource Locator (URL, a Web address)—and bang!—you're there. You can move among the sites you ve visited before with the push of a button, and it's easy to add sites to your bookmaek list. When downloading, you can either view the file or save it to disk. You can also configure Navigator to play sound or full-motion video. This Web browser really distinguishes itself in the area of usability.

Don't know where to start? Just click on Navigator's Net Search button. You're instantly presented with a host of search engines. Maybe you just want to surf the Net randomly—think of it as global channel surfing, Just click on the Net Directory button and Navigator



Not My Style: The Window Styles box seems like a strange place to assign a home page. A single button to click would be nicer.



FTP Treatment: Navigator handles unknown file types gracefully: You can choose to view the file or save it to disk to work with later.

## **Lab Notes**

Given a choice, more than half of our testers said they would choose Netscape Navigator over the competition. All testers agreed that its Web-site access methods were easy.

### What Testers Said About Navigator "Locating specific files was very difficult, but

downloading and saving them was a simple process." SYSTEMS

"It had features that were quite appealing—like a print previewer." GRADUATE STUDENT

"It was very easy to add and edit bookmarks." TECHNICAL SUPPORT REPRESENTATIVE

offers a choice of searchable maps by country, or a megalist of server sites around the globe. And if that doesn't keep you busy, go for the What's New or What's Cool buttons. With Netscape Navigator all you need is an appetite for information and adventure, and you'll be hangin' ten with the experts in no time.

Navigator 1.1 / Netscape Communications Corp. / (800) 528-6292 / \$39 direct, download from flp.netcom.com / Reader Service No. 738

and a	Accessing Web Sites	Customizing the Browser	Retrieving
Satisfaction	You should have no problem here.	Adding bookmarks was easier than organizing them.	Most found what they wanted.
Productivity	Got the job done most of the time.	Two-thirds of our testers got the job done.	Highest completion rate of all.
Help System	Help was slow, but little was needed.	Help was sporadic but often useful.	Help scarce, but not much was needed.
Verdict	***	***34	***3

\*\*\*\*\*Excellent \*\*\*\* Good \*\*\* Acceptable \*\* Poor \* Unacceptable

## Quarterdeck Mosaic: Good Gets Better

Think you're satisfied with your current Web browser? See no room for improvement? Well, take a look at Quarterdeck Mosaic. Quarterdeck, long known for its superb memory-management software, has ventured into the explosive Internet market with its first Web browser. We tested a

beta release of Quarterdeck Mosaic, a browser with a radically different look that delivers all the functionality of its better-known competitors and then some.

Chief among the new features is Ouarterdeck

	Quarter	deck Mosaic - [Welcome]	
GIF Viewer Network	Prefere   Global History   6   Data Engine   Br		Save Just
sultipart/ text/btml text/plain	htm,html,m	CONTRACTOR OF THE PARTY OF THE	URL Helper
text/richt		Create N	ow MIME Type
video/quic video/x-no video/x-no video/x-ng Type/Subtys Remarks	htime mov,qt	MIME Type/SubType video/apeg Filmasse Estensions npg.npeg.npe Enmerst MPEG Vicenel	example, stage/greg
© Save to	ll bog.mpcg.mpc deck Vewer disk m, Prompt User Vewer Application	Action:  C Quadereleck Viswe  S Save to disk  Unfanceer, Prompt Uses  External Viewer	

**Double Duty:** Just when you think you've made it through all the steps that are necessary to define an MPEG viewer, Quarterdeck Mosaic makes you repeat the process in a second, unexpected "Create New MIME Type" dialog box.

Mosaic's object-oriented Hotlist, Quarterdeck Mosaic stores all of your Hotlist entries in folders, and lets you have folders within folders. Best of all, it adds drag-anddrop functionality to the Hotlist manager. This longawated feature is sure to please longtime Web junkies whose Hotlists are longer than the Mississippi River. Our seasoned testers found Quarterdeck Mosaic to have the best bookmark handling of all the products tested; however, less-experienced users had a bit of trouble when trying to create a new Hotlist.

Testers described Quarterdeck Mosaic's one-click navigation as "extremely simple." Right mouse-button functionality was also a crowd-pleaser. Like Netscape Navigator, Quarterdeck Mosaic comes with an extensive list of predefined sites to get you started.

Even in its prerelease state Quarterdeck Mosaic outscored veteran NCSA Mosaic in usability. Simple details, such as buttons including both rest and graphics, pleased testers. Its local online help got mixed reviews, however. When testers were asked to pick favorite, it was second only to Netseape Navigator.

Quarterdeck Mosaic's one weakness was the lack



History Repeats Itself: You can use Global History to keep a record of your Web travels for seven days.



Form-Fitting Help: Experts will fill in the blanks and be off; but if you're a beginner, the URL Helper's many parts may confuse you.

## **Lab Notes**

Testers liked Quarterdeck Mosaic's interface, but found its local help file less than effective.

## What Testers Said About Quarterdeck

"The URL Heiper was very useful for creating the correct Web address."

## SENIOR SUPPORT

"I couldn't move entries around in the Hotlist. I did manage to move one entry into another folder, then I couldn't move it back." REALTOR

## "It took a long time to download graphical Web pages. If it was set up as text-only, access time was very fast." TECHNICAL SUPPORT

REPRESENTATIVE

of a progress indicator while downloading. Keep in mind, however, that the version we tested is a beta release. This is a fairly minor problem and may yet be addressed before the final release.

With an entire suite of Internet applications offered, Quarterdeck should be a serious contender.

Quarterdeck Mosaic 1.0, beta release 3 / Quarterdeck Office Systems / (310) 392-9851 / \$30 est. street price / Reader Service No. 739

and a	Accessing Web Sites	Customizing the Browser	Retrieving Information
Satisfaction	You need to know exact addresses.	Does what you need it to do without a fuss.	Not much grumbling heard.
Productivity	URL Helper prompts you for address components.	Fairly quick and easy.	It gets the job done.
Help System	Help was not often helpful.	Help was hit- and-miss.	Help was useful only half the time.
Verdict	***	***5	***15

\*\*\*\*\*Excellent \*\*\*\* Good \*\*\* Acceptable \*\* Poor \* Unacceptable

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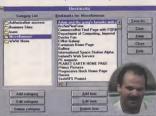


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## InterAp: Worthy Contender

This newcomer is bound to make the big guys squirm. InterAp from California Software is actually an entire suite of Internet software that includes a Web browser, FTP, e-mail, a Usenet newsreader, and other Web utilities. Each of the applications can be started from an efficient

Launch Pad. In this round of tests we examined only the Web browser, but if it's any indication of the rest of the InterAp collection, California Software is definitely on to something.



By the Bookmark: California Software InterAp's clean, efficient Bookmarks window has easy-to-find and easy-to-use buttons to expedite housekeeping chores. You'll appreciate its intuitive, File Manager-like interface, although it lacks the drag-and-drop functionality.

> Like Ouarterdeck Mosaic, InterAp departs from the classic Mosaic look and feel. Its hierarchical bookmark system is superior when it comes to moving, deleting, and cataloging bookmarks. You can add new ones simply by clicking on a button on the toolbar-a real convenience. Testers found InterAp's File Manager-like interface clean and eloquent. However, they would have liked the ease of drag-and-drop functionality as well.

InterAp also scored well in customization. For Internet users with slower modems, suppressing the display of graphics is critical to performance. InterAp lets you turn graphics on or off right from the toolbar, and the "bubble help" lets you identify icons quickly. Testers also praised InterAp's ease in MPEG viewer configuration.

Accessing Web sites with InterAp proved to be a speedy process. Testers of all skill levels were impressed with performance and ease of use, but new users longed for the convenient lists of starter sites provided by competitors Netscape and Quarterdeck.

InterAp and fellow newcomer Quarterdeck Mosaic represent a departure from-and some will say an



Room with a Viewer: You'll have no trouble assigning an MPEG viewer.



O Give Me a Home: You must enter a new home page URL manually.

## Lab Notes Tester comments nositive about

were overwhelmingly InterAp, It turned in respectable scores in productivity.

What Testers Said About InterAp "I would want a button to automatically fill in the default home-page value

for me when I was connected to the site." TECHNICAL SUPPORT REPRESENTATIVE

"It was easy to find sites and the screen representation was good. but help was a bit weak." TEST ENGINEER

"I very much liked the bookmark and folder capabilities available in this software.

SYSTEMS ADMINISTRATOR

improvement upon-the tried-and-true Mosaic interface. In usability tests, InterAp outperformed NCSA Mosaic and equaled both Quarterdeck Mosaic and Netscape Navigator. Choosing among them will depend on which tasks you do most often, and InterAp is definitely worth a look.

InterAp 3.1 / California Software / (800) 830-3311 / 599.95 retail (\$49.95 competitive upgrade), 30-day free trial, download from ftp.calsoft.com / Reader Service No. 740

and a	Accessing Web Sites	Customizing the Browser	Retrieving Information
Satisfaction	It was easy to find sites.	One click adds bookmarks.	Works, but it could be simpler.
Productivity	Most users got it done with ease.	Easy, with few exceptions.	It gives you what you ask for.
Help System	Not much help available.	Better than most.	No help was needed.
Verdict	***	***35	****

\*\*\*\*\*Excellent \*\*\*\* Good \*\*\* Acceptable \*\* Poor \* Unacceptable



## STILL

## The Most Usable Browser

Your time is valuable. With every online nanosecond costing money, you need speed. On the World Wide Web, terabytes of data make even a 14.4Kbps modem beg for mercy. However, most Web browsing is done not by the software, but by the user. And a confused user wastes time. A fast car will get you nowhere if you don't know how to drive it.

Netscape Navigator, Quarterdeck Mosaic, and California Software InterAp all turned in higher usability ratings than the erstwhile leader, NCSA Mosaic. But our testers completed only 70 percent of the assigned tasks with each application—not enough for any of these browsers to get the four stars necessary to earn our Usability Seal of Approval. When it came to user preference, however, Netscape Navigator had a slight edge, with 55 percent of our testers saying they would buy it. No one chose the now-aged veteran NCSA Mosaic.



Point and Shoot: Testers enjoyed Netscape Navigator's clean, uncluttered look and large, easy-to-read toolbar. A generous selection of buttons—including What's New, What's Cool, Net Search, and Net Directory—give you a jump start on finding the best sites. \*\*\*\*\*5



Hottest List in Town: Quarterdeck Mosaic's bookmarks use the familiar Windows File Manager style. Scrollable windows display the Web page and Hotlist simultaneously. With folders and subfolders, it's powerful and intuitive. Drag-and-drop functionality offers added flexibility. \*\*\*\*

SATISFACTION: Most testers preferred Netscape Navigator, but they also had good things to say about InterAp and Quarterdeck Mosaic.

say about InterAp an Quarterdeck Mosaic, NCSA Mosaic, however, has become yesterday's news. PRODUCTIVITY: Why no
Usability Seal? All of
the browsers turned in
acceptable scores, but
not one distinguished
itself from the pack.
They all earned less
than the minimum
four stars required.

HELP SYSTEM: Testers found the Web-based belp in NCSA Mosaic and Netscape Navigator trying, Help is on the disk in Quarterdeck Mosaic and InterAp, but it's somewhat lacking, too SUMMARY: Netscape
Navigator got the
most votes, but
we think you'll also
like Quarterdeck
Mosaic's Hollists
and the Bookmarks
in California
Software InterAp.

## Lab Notes: What Testers Said About Web Browsers

### California Software InterAp



"It wasn't difficult to enter a new default home nage, but I would have preferred a button on the toolbar that I could use to automatically enter the URL while I was at the site. I liked the simple toolbar button to toggle the display of graphics."

SENIOR TECHNICAL SUPPORT REPRESENTATIVE

## NICSA Macaia

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"I was finally able to configure the browser for MPEG video support, but a secondary box came up asking about a 'disk or viewer' that was confusing to me. Since there was no local help, and it took forever to get online help on the Web, I did the best I could."

TEST ENGINEER

## The Script

For every comparative product usability test, we design a script that consists of a set of common tasks We report the test results in three key areas: user satisfaction, productivity, and help. The satisfaction score reflects the testers' preferences on a scale of one to five (in which five is best). The nroductivity score reflects the percentage of tasks completed. And the help score reflects the percentage of online help references that actually provided useful answers to the testers' questions.

How We Tested To evaluate four Web

browsers, we brought two types of user into our Usability Labs: novices and experienced users. None of our testers had previously used any of the browsers under examination, although all had spent time online and were familiar with uploading and downloading. We urged the testers to think out loud, You'll find some of their comments throughout this article. We asked each user to access selected Web sites download files customize the browsers; and add, delete, and create bookmarks and bookmark categories. Testers averaged eight hours to complete the tests. After all the tasks were completed, we asked each tester which of the four products he or she would buy, if making an immediate purchase. The response to this question was weighted into the final scores for

each product.

\* Unacceptable

\*\*Poor

HOW THE WER BROWSERS STACK UP

Factor	InterAp	Netscape Navigator	Quarterdeck Mosaic	NCSA Mosaic
1. Navigation Weighting: 30%	***Accessing Web sites is not difficult, but can be tedious at times.	***Good response times mean best performance for modem connections.	***Easy, but addressing requires you to know your URLs.	***Gets there, but site lists are tough to manage.
2. Bookmarks Weighting: 30%	**** Easiest bookmarks. Most of our testers had little trouble.	*** Bookmarks are easy to create, but tough to organize.	*** Creating Hotlists is a breeze, but moving entries is troublesome.	** 14 Hot lists need work. Not as easy as they should be.
3. Customization Weighting: 20%	***% A few problems, but logical and concise.	*** Testers got it done, but it could be easier.	*** Not as easy as it should be, a little cryptic.	***Left testers confused and guessing.
4. Downloading Weighting: 20%	****It's simple and almost automatic.	***\frac{1}{2} Files came down the pipe effortlessly.	***% One-click downloading.	***Testers didn't always get what they wanted.
Verdict 100%	* * * * 2 Best site management tools and easiest downloads.	*** ** Fast and efficient. Preferred by 55 percent of our testers.	* * * * A strong showing. Good interface and navigation tools.	* * * No longer the leader. Still works, but could be easier to use.

\*\*\* Acceptable

\*\*\*\* Excellent

\*\*\*\* Good

## The Web Awaits

Any of these browsers will get you where you want to go, but how you get there is as important as what you'll find. Can you just hop in a cab and say "airport," or do you need to drive? We found that Nesscape Navigator, Quarterdeck Mosaic, and California Software Intertoffer usability advantages over veteran NCSA Mosaic.

Should you look for performance or usability? While the speed of data transmission is largely dependent upon your modem, the real measure of a Web browser's efficiency lies in its usability. Internet access costs you by the minute, so you don't want to waste time scratching your head. Users' most frequent tasks are accessing Web sites, managing bookmarks, and downloading files. InterAp's and Navigator's suggested sites help you get started quickly, while the bookmark managers in InterAp and Quarterdeck Mosaic help you say organized.

Can you keep the data organized? The World Wide Web will quickly funde unprecedented amounts of information into your life. Where will you keep it? Once you have it, will you be able to find it when you need it? How the software lets you store, find, view, move, and delete data can determine the

usefulness of that data. Quarterdeck Mosaic and NCSA Mosaic both include tabbed preference dialog boxes to make customization easier. The latter, however, doesn't let you decide where to store downloaded files.

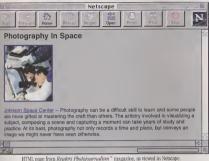
Which Web browser will help you be more productive? Ease of use depends largely upon the tasks you do most often. What is intuitive to one user may be nonsense to another. All four browsers offer many shortens, but can you find the features you wan? How many steps will it require? And when you 'veried your darndes, is, shelp at hand? None of the browsers we tested offers adequate help, and only InterAp and Counterdeck Mossie provide local help functions.

Which Web browser is best for you? Choose a browser whose features best match your own needs. While none of these Web browsers earned our Usability Seal, each has its strong points. And they all cost \$100 or less. The price is right, so get on the Web now. But if you get hooked, don't say we didn't warn you!

PC Computing Usability Labs Team: LULIT BEZUAYEHU, GEORGE HACKMAN, JR., and LYDIA M. KARLOWICZ.



## COMMONPLACE.



## COMPELLING.



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Even the coolest dudes find Nanao's new 17" monitors way cool. The new F2·17EX and T2·17TS models can't be beat for the ultimate

in text and graphics performance. Which is why they'r setting sales records at savvy computer stores. Another reason is Nanao's Windows \$5 Plug & Play\* compatibility. Complicated user set-up adjustments at the time of installation are witnally eliminated. And switching resolutions on-the-fly is a snap. Users are also drawn by Nanao's reputation for outstanding long-term tellability plus the stuming array of new advanced technical features that are ideally suited for graphical environments. Nanao even offers a choice of four 17° models to satisfy your budger,

application requirements and tube preference. The E2-I7Ex features at ultra fine doe pitch Invar shadow mask flat-square tube, while the T2-I7Ts features the new hybrid technology aperture grill tube. Both monitors provide the power you need to achieve true to-life colors, crisp typography and a stable screen image. Flicker-free resolutions up to 1280 x 1024 & 2024 & 2024 to 1280 x 1024 with the stable provided in the provided provided the stable provided the stable provided to the stable provided the

If you're wondering why this dude looks so satisfied, it's easy to figure out. He just caught the perfect wave. And the perfect 17" monitor.

F2+17EX
Dot Pitch 0.26mm
Actual Viewing Diag. 16.1\*
Scan Freq. H30-86kFtz, V55-1609z
Rec. Resol. 1280 x 1024 @ up to 829z

Max Resol.
On Screen Control

Standards

T2-17TS
Grill Pitch 0.25m
Actual Viewing Diag. 16.0\*
Scan Free. H330-1

Actual Viewing Dieg. 16.0"
Scan Freq. H:30-86kHz, V.SS-160Hz
Rec. Resol. 1280 x 1024 @ up to 82Hz
Max Resol. 1600 x 1200 @ up to 65Hz
On Screen Control ScreenManager" and

trol ScreenManager" and ScreenManager" Pro MPR-II, TCO, FCC B

1600 x 1200 @ up to 66Hz

ScreenManager" and ScreenManager" Pro

MPR-IL TCO, ECC B

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# The Search Engine That Could

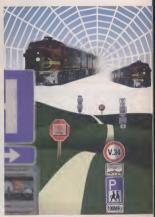
Inding what you want on the Internet can be even more frustrating and time-consuming than finding a bagel in Biloxi. So what do you do? Easy: Let the Internet do your searching for you. Luckily, a new breed of search engines is available to help you locate what you need. Until the World Wide Web came along, if you wanted to search the Net you

had only a few choices—the FTP archiver Archie, the Gophersecking Veronica, and the database-finding Wide-Area Information Server (WAIS). Although they're useful a what they aimto do, they're not very friendly and the information they deliver is somewhat limited. And the explosion of the Web has taxed their functionality to the breaking point.

The Web grew so large so quickly that it became practically impossible to find anything at all. Your only hope was surfing by the hour and creating bookmarks or hotists that grew to be almost as unmanageable as the Web itself. Important sites and resources appeared on the Web weekly, then daily, and then even more frequently. Something had to be done.

It was. Web users saw the deficiencies, and began to develop search tools. Search engines didn't take long to eath on. They've proliferated over the past few months so that today you have a very strong selection to choose from—and most of them cost nothing to access. Looking for financial info? Start with the search engines. Looking for marketing help? Start with the search engines. Looking for Doom add-ins? Yep, the search engines help here, too.

Which search engine can get you the information you need? We went out onto the Web with a fisful of queries ranging from stock market quotes to sound files of independent music releases, and then watched as the 14 top search engines showed us what they could do. Because one size doesn't fit all and needs vary widely, we conducted a jury test to factor in a variety of responses about the search engines. With so many to choose from, your biggest challenge may be searching for the right search engine. Read on.



BY NEIL RANDALL

## Hide and **Go Seek**

What should you look for in an Internet search engine? First, a powerful and usable interface. As with database searching tools, that's the make-or-break point. If its search is difficult to configure, you're not likely to return to that tool. But if the interface is too simplistic, you won't be able to customize your query to pinpoint the desired results. Second is the quantity, precision, and readability of the results you get from your searches. It's nice to get 500 hits, but not if 400 of them aren't really on target. And if all you get back is a hyperlink with no explanation, you're not likely to benefit much.

Highlights The way you initiate a search differs dramatically from search engine to search engine. Although EINet Galaxy and Yahoo ask for simple search strings, they also let you specify the Internet server you'd like to search (FTP, Gopher, HTML, and so on), and determine how comprehensive (files, directories, or only addresses) the search should be. InfoSeek. the only fee-based engine among those we tested, is the most comprehensive, letting you search not only Web sites, but also newswires, magazines, and even movie reviews. Open Text is designed to search only its own database-as are Lycos, JumpStation II, and othersbut each offers a different kind of interface. WWW Worm lets you type in a search string and then decide on a Boolean operator (AND or OR), the elements of Web pages you want to search, and the number of hits you're willing to wait for. The CUI W3 Catalog engine offers a choice between a keyword-only search or a fully configured search written in the Unix language, Perl

A fairly new phenomenon is the search metapage, which lets you access many different engines from one site. CUSI and All-in-One Search Page are two examples. Although they tend to be slow, they present one interface for all the engines under their umbrellas. An

> - B & ± & B A ■ Query: [Japan marketing] Collection: WWW Pages Titles: 1 through 20 of over 200 INFOPLAN HomePage Japan's Leading Marketing Research and Consulting Service . What's New? is one of Japan's leading firms of marketing research and planning consultancies. Our Japan VALS

Quality: InfoSeek searches provide good descriptions. Save the query in your Personal Newswire for automatic updates.

even newer phenomenon is the multithreaded search page, such as Internet Exploration Page and Savvv-Search. They not only let you search across a variety of engines simultaneously, but they also let you specify which engines you'd like to use, as well as how long you're willing to wait for the results. This can be critical, because a complex multithreaded search can conceivably last for hours. SavvySearch doesn't even force you to decide which engines to use. Just select the resources and the number of engines to search, and it does the rest.

Lowlights The end results varied every bit as much as the interfaces and search forms themselves. Where InfoSeek presented a well-structured list of hits with explanations of each, AliWeb offered only a series of unexplained hyperlinks. Even SavvySearch faltered at presenting results, despite its strong interface, while CUI W3 Catalog did the reverse, offering comprehensive explanations despite an extremely limited opening interface. The links returned by Open Text and EINet Galaxy were not very useful.

Still, even the most unreadable results should be fine as long as you get enough of them and they're exactly on target. Numbers aren't generally the problem with these search engines: AliWeb, EINet Galaxy, WebCrawler, WWW Worm, and Open Text all presented extensive hit lists, while only CUI W3 Catalog, JumpStation II, and SavvySearch seemed reluctant to cough up hordes of information. But precision is another story entirely, and easily the most disappointing factor of all: CUI W3 Catalog, AliWeb, WebCrawler, and EINet Galaxy all offered unspectacular accuracy, even on searches with a fairly specific search definition, such as "marketing in Japan." For pinpoint search precision, only one engine-Info-Seek-performed well on virtually all searches.



weighted matches (a score of 1,000 is considered a direct hit).

## Rating Internet Search Engines

How They Measure Up in Our Lab Tests

Product	Description	Usability	Effectiveness	Verdict
InfoSeek //www.infoseek.com:80/Home Resider Service No. 737	Pay-as-you-search sites (\$9.95 a month with 100 free queries) with natural- language search strings.	***** Interface, instructions, and customizability excellent throughout.	*****Plenty of hits with unusually high accuracy.	* * * * ½ The best of the bunch, but it isn't free.
Lycos //lycos.cs.cmu.edu/	Popular site, with good customized searching on over 3 million pages.	**** Provides excellent descriptions of results.	*** High number of hits, and precision of results is usually excellent.	* * * One of the best free tools for searching the Web.
WebCrawler //webcrawler.cs.washington.edu/	Large database with simple search form; acquired by America Online.	**** Excellent interface throughout and easy to use.	**** Very high number of hits but too many slightly off topic.	*** Strong, and getting better all the time.
WWW Worm //www.cs.colorado.edu/home/ mcbryan/WWWW.html	Over 3 million URLs constantly searched.	*** Easy-to- understand front page with forms-based but limited customization.	***** Excellent quantity of hits and usually very high precision.	****One of the top Web-based search tools.
All-in-One Search Page //www.albany.net/~wcross/all1srch.html	Colorful metapage with well-designed interface.	****Interface reflects unique elements of individual engines.	***Convenient to access several engines, but slow at retrieving information.	* * * ½ Excellent starting point for Internet searching, but not multithreaded.
Internet Exploration Page //www.amdahl.com/internet/ meta-index.html	Combination multithreaded and individual search page.	***Good for searching multiple sites.	****Time limit determines quantity and quality, with strong results.	* * * ½ A good start and often all you need.
Open Text //www.opentext.com:8080/	Full-text search engine of over 1 million Web pages.	****Easy-to-use interface and solid search capabilities.	*** Results always plentiful but far too frequently off target.	* * * ½ Continually improving; good for precise search strings.
Yahoo //www.yahoo.com/search.html	Superb search site and Web subject index.	*** Easy to use, but limited in search types.	**** Quantity and quality of results consistently good.	**** Always a useful place to start.
AliWeb //www.cs.indiana.edu/aliweb/form.html	Archie-like search engine that holds copies of FTP directories and files for fast searches.	*** If you like Archie, you'll like AliWeb.	** Always a large number of hits but far too few directly on topic.	* * * Good place for broad searching, but not for precision.
CUSI //pub/web.nexor.co.uk/public/cusi/ doc/list.html	Single page with forms for searching Web sites, Gopher, Internet users, and shareware.	***Easy to use, but little customizability and few advanced features.	* * * Results depend entirely on destination search tool; often slow processing.	* * * Good site to use to access individual engines.
EINet Galaxy //galaxy.einet.net/	Well-established search site and subject index.	***Strong customization, but not intuitive.	*** Consistently high number of results, but unpredictable precision.	* * Better for its subject catalog than its search abilities.
JumpStation II //jsstir.ac.uk/jsbin/jsii	Innovative search form lets you access large database of agent- acquired Web sites.	***Strong search form and customizability make you want to return.	*** Relatively low number of hits, but reasonable accuracy.	* * * Mainly useful to confirm results of other searches.
SavvySearch //www.cs.colostate.edu/~dreiling/ smartform.html	Friendly site that searches multiple engines simultaneously.	***Simple interface, but results are hard to read.	***Disappointingly low number of hits, but very good precision.	* * * Excellent promise for this multithreaded page.
CUI W3 Catalog //cuiwww.unige.ch/cgi-bin/w3catalog	One of the oldest search sites; uses Perl strings.	** A pretty good place to start, but who wants to learn Perl?	** Hits are useful but limited in number.	* * Rarely a candidate for in-depth search tasks.

PC COMPUTING

## **Info, Where Are You?**

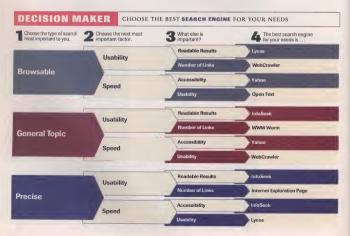
Which Internet search engine is beat? They all have their strengths and weaknesses, and your best bet is to learn how to use an entire arsenal of them. But we were particularly impressed with InfoSede (the only one tested that you have to pay to use). Internet Exploration Page, Yahoo, Open Text, WebCrawler, Lycos, and WWW Worm made their mark as well.

For the most thorough search engine, you'll want to spend the \$9.95 per month for IndoSeck, Your next best bet is either WebCrawler or WWW Worm, which together will give you almost all the results you need (kick in Iycos, and you have little need for anything else). If you're searching for keywords in documents, Onen Text is extremely fast.

The metapages—All-lin-One Search Page, CUSI, Internet Exploration Page, and SavyySearch—provide one-stop access to several engines. You can expect to see more of this trend, especially multithreaded search pages, which can rummage through multiple engines simultaneously. After all, who wants to keep track of a dozen search engines? Although the metapages are very useful, they present their own limitations: They don't

usually offer the full earch customizability of the original engine, so the results are generally much less percise. And they can be painfully slow. A multithreaded search page must work its way through several sites on the Net, any one of which might be tied up doing other work. (Remember, the servers where these free services reside cocasionally have to earn their keep by doing some real work like accounting or data processing.) Such delays can grind your search to a standstill.

And one more trend is clear Free search engines are an endangered species. InfoSec Alarady charges for its services, and EINet Galaxy is now part of EINet Comportion, acquired by SunRive, presumably for commercial purposes. America Online recently bought both Web-Crawler and long-time Internet database specialists WAIS Inc., and the Microsoft Network has licensed Lycos. Exactly what these acquisitions mean for the coast of searching on the Internet remains uncertain. But there is a silver lining: Expect the tools to become more refined when you start paying for searches. If getting precise results easily and quickly is your goad, this should be a welcome trend.





## REMOVE-IT NEVER FORGETS TO TAKE OUT THE TRASH.

Oops. You let your guard down and now your hard disk is a mess. And the old applications, fonts, and files littering your PC's landscape are more than

just unsightly. They can fill up your hard disk and sabotage system performance, Wouldn't it be great if someone could clean the garbage out of your computer, or even your entire network? A trusted friend who could do the job automatically, safely, and thoroughly?

Look no further: Remove-IT is the ultimate custodian for your computer.

### IT'S A BROOM WITH A BRAIN

Don't feel guilty about having a messy hard drive-it's really not your fault. You see, every time you install a program, it hides bits and pieces all over your system. And here's the kicker: Even when you delete the application, piles of "secret" garbage are left behind.

But there's no trash heap that Remove-IT can't find. Its watchful Smart Disk Custodian automatically alerts you to unused or unneeded

programs. And Remove-IT has a unique

Installation Knowledge-Base - a virtual encyclopedia of more than 850 popular

LEAVES EVERY OTHER UNINSTALLER IN THE DUST

Remove-IT 2 Uninstaller 3

Smart Disk Custadian Cleanup Coach Installation Knowledge-Base Windows 95 Upgrade Assistant Emergency Recovery Disk

**Automatic Installation Lagging** 

Windows, and DOS applications. Together with the Log-IT feature, it remembers the location of everything you install to ensure safe and complete removal. Remove-IT even makes selfinstalling backups so you can easily transfer your programs to other PCs.

## SAFE SANITATION

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and applications when you "clean house," Remove-IT's helpful Cleanup Coach expertly guides you through the removal process, while its Safe Removal Technology protects you from deleting the wrong files, Remove-IT is more powerful and far more user-friendly than any competing program. It just works smarter - way smarter!

## ARE YOU REALLY READY EQ FOR WINDOWS 95?

Remove-IT has a customized Upgrade Assistant that automatically prepares your PC for Windows 95 and reduces the chance of an upgrade problem. Then it cleans and configures your system after

Windows 95 is installed. And even though Remove-IT is the most powerful cleaning machine you can buy, it won't clean out your pocketbook. We're now offering the latest version of Remove-IT-version 2.0-for

just \$44.95. Ask for Remove-IT at your favorite retailer, or call our handy tollfree number:

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Ask for ext. 108

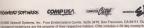




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## Create Your Own Web Page

ast time you fired up your browser and checked out the business pages on the Web, did you get the strange feeling that your company was the only one on the planet without its own home page? Businesses of all sizes are out there, from Microsoft, AT&T, and Wells Fargo Bank to Joe's Florist Shop. And the U.S. government seems to have

spent most of last year's deficit creating Web sites left, right, and left again. It's no longer a question of whether you'll have a Web site, but when, and how elaborate you want it to be. Most likely, you're thinking, "We need it yesterday!" and "We want the Web and we want it now!"

Think you don't need a presence on the Web? Well, you don't—not any more than you need a sign outside your business or a listing in the Yellow Pages. More than just another place to deliver your message, the Web is a place where you can interact instantly and directly with your clients and suppliers.

You could buy a Silicon Graphics server and pay someone to administer your Web site for you, but there's an easier, faster, and far less expensive way to do it. All you really need to establish a World Wide Web site is a Web server and Web documents. The server usually resides on a Unix host, but strong server software is now available for Windows NT.

Web documents are usually written in hypertext markup language (HTML), which has fairly simple formatting. There's nothing fancy about an HTML file; it's simply ASCII text with formatting codes added. You can create these files in any text editor, but if you do you'll need to imaster typing the HTML. codes. We looked at two kinds of HTML products that make the job casier—stand-alone applications and add-in that work with your current word processor and provide a great way to administer your Web page. Read on to learn which is best for you. Along the way, we'll give you some pointers on how to design effective pages that will make your Web site stand out from the crowd.

BY BENJAMIN F. MILLER AND NEIL RANDALL



## **Web** Publishing in Windows

Several HTML editors are available for Windows users; we looked at three of the most popular. You can find a free version of each on the Internet. The professional versions, which you can purchase from the publishers, offer additional and more powerful features. And for the muscle behind the Web, we've included a Web page administrator that can help you manage your HTML creation effectively.

HTML ASSISTANT PRO 1.65

## **Effortless HTML**

At its heart, Brooklyn North Software Works' HTML Assistant Pro is no more than a text editor that doesn't have a Wysiwyg bone in its body. Whatever you type in the document window stares back at you as bare ASCII text. If you want to, you can type HTML tags directly into the document. In fact, when you first look at the blank text screen before you, you may feel intimidated by the apparent lack of bells and whistles. But you'll quickly discover that HTML Assistant Pro can turn you into a Web page author in minutes. The program offers far more than simple text editing. Its elaborate toolbar and menus give you access to all but the most recent HTML codes, and for the most part all you have to do is select the appropriate menu item or push the correct button. Each toolbar button is identified by a help message at the bottom of the screen, so you never have to open the manual. Should you be so daring, you can even opt to display a lower toolbar filled with buttons that give you quick access to specific HTML

codes. Many of the features on the toolbar are configurable via clearly identified menu choices.

A handy feature in this version of HTML Assistant Pro is a Background Assistant that lets you quickly and intuitively add colors, patterns, and images in the background of your Web page. This is extremely useful if you want to go beyond functional and

FILEBOX

HTML
Assistant Pro 1.65
Usability \*\*\*\*
Technology \*\*\*\*\*

Verdict \*\*\*
A powerful and relatively easy-to-use HTML editor.

Pros: Straightforward

approach lets you get to work.

Cons: Lack of Wysiwyg
interface may be intimidating.

\$100 est. street price Brooklyn North Software Works (902) 498-6080 Reader Service No. 852

produce attractive, eye-catching Web pages.

One of the basic building blocks for navigating through a Web page is a live of links or files available from that page. Instead of offering an elaborate listing structure, HTML Assistant Pro lets you simply type the list items in the observation of the styles of the structure with the letted or numbered list too. The same goes for headings and other styles type, highlight, and select. You can create a storchouse of universal resource locators (URLs) for documents by importing Mosaic or Cello holistics, Boochmarks from Netscape's Navigator are already stored as an HTML light of the style of the s

HTML Assistant Pro offers an excellent HTML page autocreator, which is a great get-yourself-up-and-running feature. It's not claborate, but it lets you use images, saved URLs, and existing text files. The idea is to get you started, and it succeeds admirably. This program doesn't hide you from HTML's ugliness, and it doesn't check your HTML syntax, but it offers a great deal of freedom and power. Download a free sample from http://fecnet.grim.edu/software.



HOTMETAL PRO

## **Expert** Net Publisher

SoftOuad's HotMetal Pro is the polar opposite of HTML Assistant Pro: It's complex, demanding, and it looks very strange onscreen. But once you get used to the strangeness-and learn to work with its demands rather than against them-HotMetal Pro distinguishes itself from other HTML editors in its detail and expandability, Another difference? HotMetal Pro requires that you have some knowledge of HTML before you can get started. HotMetal also offers an import function for easilv editing existing HTML documents.

HTML is an older cousin to the much more complex standard generalized markup language (SGML),

Force Une Break Table Cell Braille Marker (experimental) Citation
Example of Code [compare with PRE]
[Inserted automatically by TABLE]
[Inserted automatically by TABLE]
[Inserted automatically by TABLE]
Total of Definition
Directory Listing, Items each <= 24 characters
List of Terms and Definitions
Terms by the Defined Emphasis On-line Form [level 2, HTML2] V Include Required Flements Insert Element Cuncel

HotMetal Pro is based. SGML is a superset of HTML. Whenever you create HTML code in this program, vou're simultaneously devel-

oping SGML

code. Later, as you move documents toward the SGML standard, your current HTML files will be ready for the leap. SGML is an improvement over HTML because, although it incorporates the same hypertext functionality as HTML, it stores data as independent objects rather than as files. This makes SGML files smaller and less bandwidth-intensive than HTML files, so SGML files can be downloaded faster.

At first, HotMetal Pro's rigorous rules-checking may be annoying, especially if you've been slapping together HTML code with no concern for "correctness." But if you're ambitious, you'll come to appreciate HotMetal Pro's discipline as well as many of its advanced features. HotMetal Pro isn't for HTML newbies, but it's a comprehensive package. Download a free sample from http://gfecnet.gmi.edu/software.

## HotMetal Pro

Usability Technology \*\*\*% Verdict A powerful HTML and SGML tool that requires a bit of study.

Pros: Because it can create SGML code, it's poised for the future. Cons: Requires some HTML

experience

Reader Service No. 853

LIVE MARKUP PRO

BR CAPTION CITE CDDE CDLDEF CDLDEFS

## **Hide** the HTML

One of the more recent entries in the HTML editor sweepstakes, Media Tech's Live Markup Pro is a 32-bit Wysiwyg editor with many advanced features. More than HTMI. Assistant Pro or HotMetal Pro, Live Markup Pro strives to hide HTML from your eyes, offering instead a series of menu items, toolbar buttons, and mouse menus from which to make your choices. In other words, the editing interface looks like any basic word processor. The end result is a document that looks more or less like what you'll see in your browser, keeping in mind, of course, that the various browsers display HTML documents differ-

ently. In any case, Live Markup Pro provides an excellent example of Wysiwyg Web page creation. Live Markup

Pro takes some getting used to. Because its ruleschecking system

is unobtrusive, it's not a hindrance. Getting started creating HTML code is anything but intuitive, however. Creating a list, for example, requires that you perform a seemingly endless series of mouse clicks on various buttons. Other simple editing elements are a bit different from other programs as well. After you create a few documents, however, the benefits of Live Markup Pro's interface become clear, and you'll find yourself mov-

ing from element to element, and menu to menu, with relative ease.

As with HTML Assistant Pro and HotMetal Pro, a 16-bit version of Live Markup is available free via the Net. But even more so than with the others, you'll appreciate the 32-bit Pro version of this product if you're serious about HTML work. Download a free sample from http://www.mediatec.com.

## FILEBOX

(800) 526-8012

Reader Service No. 854

Live Markup Pro Usability Technology \*\*\* Verdict A good choice if you never want to see HTML. Otherwise. choose HTML Assistant Pro. Pros: Sleek interface that hides ugly HTML tags. Cons: Less-than-intuitive approach to page design.

Welcome to MyCompany!

WEBSITE 1.0

## Web **Administrator**

WebSite 1.0 for 32-bit Windows platforms from O'Reilly & Associates is a complete solution for administering a Web page and delivering it to the outside world. It's not an HTML editor, but a set of tools to control and monitor access to any Web passes that you've sublished on the Internet.

WebSite's Web Server and WebSite Administrator tools act in tandem. Web Server is an active monitor



that runs in the background, while WebSire's installation program gets Web Server up and running once the install routine is finished. WebSite Administrator can be accessed on its own or from a menu in the Web Server dialog box. WebSite Administrator is a series of trator is a series of

tabbed dialog boxes that let you quickly and easily configure every aspect of your Web page, from access restriction to individual users and user groups to setting TCP/IP parameters. Il goes so far as to allow you to keep tabs on the URL connections in your Web page—the locations of the hot-linked documents as well as the types of files and icons that represent them. All of this is accomplished in a metaphor that will be very familiar to

Windows NT administrators.

Because you'll want to be able to see your Web page—as well as do some surfing on the side— O'Reilly & Associates has generously tossed Spyglass Mosaic into the package as well. For a complete set of Web administration tools, the WebSite combination is an essential product. Download a free sample from http://website.org.com/

## FILEBOX

WebSite 1.0 Usability

Usability \*\*\*\*\*
Technology \*\*\*\*\*
Verdict \*\*\*\*
A complete set of Web

administration tools.
Look no further than this
essential Web tool.

Pros: Easy-to-use and full-

featured administrator.

Cons: A little too expensive

\$349 est. street price O'Reilly & Associates (800) 998-9938 Reader Service No. 855

## **GUIDED TOUR**

WEB PAGE DESIGN SECRETS: CHOOSE THE RIGHT ELEMENTS

Style Guide: Sure, any of the products in this review will let you create a Web page, but none of them will tell you what your finished product should look like to get the most positive response. In answer to that, the Web-masters at PC Computing have devised this quick-and-easy style guide.



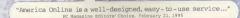
- A LOSO: Your stationery has your logo, and so should your Web page. Make it memorable, but not huge. Your logo should give customers an idea of what you're all about.
- B SPACE: Use the page carefully, and don't cram too much into limited space. When there's too much detail, most of it gets lost, Leave a little space in your opening page so users will want to dig further.
- EXPLANATIONS: Don't just give links, explain them. PC Computing's Web page lets readers know if they'll want to click. Lef your readers look before they leap.
- IMAGE MAPS: Images work best if they're links to another location. PC Computing's Web Map is endlessly accessible. Plus, the image itself should be eve-catching.
- GRAPHICS: Icons are better than simple bullets, but if they're too big they'll take forever to download. Make sure your graphics are relevant to your company and your Web page design.
- OEPTH: Links should lure readers deeper into the Web. A good home page gives them a reason to explore. Make them curious about where your links lead to.

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"So easy, it's hard to believe you're online." PC Computing Magazine, September, 1994





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Other:

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# HTML Editing Made **Simple**

Your word processor already handles formatting codes, so why not let it code HTML documents as well? That's the thinking behind these word processor add-ins, two of which work with Microsoft's Word 6.0 and another that expands the capabilities of WordPerfect 6.1 for Windows.

INTERNET ASSISTANT

### **Word** on the Web



Internet Assistant installs directly into Microsoft's Word 60, turning the word processor into a reasonably full-featured HTML editing and browsing tool. Still in beat form when we tested it, Internet Assistant is more usuful as a conversion tool than as an authoring tool. It offers a simple way to turn existing Word documents into fully stylized HTML files. Word performs the conversion through its AutoStyle feature, then lets you view the results in the built-in Web browser. Download a free sample from the indirectors through tist.

#### FILEBOX

#### Internet Assistant

Usability \*\*\*\*
Technology \*\*\*
Verdict \*\*\*

A useful tool to augment your
Web page creation.

Microsoft Corp

WEBAUTHOR FOR WORD FOR WINDOWS

## **Instant** HTML



Like Internet Assistant, Quarterdeck's WebAuthor installs into Word 6.0 for Windows as a series of templates and macros. WebAuthor is designed as a direct HTML authoring tool rather than a conversion assistant. WebAuthor keeps HTML codes front and center, but it makes them easy to work with and offers two ways of working—in Edit or Wysiwiyg mode. WebAuthor is a highly polished product. It meticulously checks for incorrect HTML coding and includes excellent form creation tools. Download a free sample from http://www.qdeck.com.

FILEBOX

#### WebAuthor

Usability \*\*\*\*
Technology \*\*\*\*
Verdict \*\*\*\*
Everything you need for HTML editing in Word for Windows.

\$99 est. street price Quarterdeck Office Systems (800) 354-4757 Reader Service No. 856

INTERNET PUBLISHER

# **Perfectly** Easy Pages



If you own WordPerfeet 6.1 for Windows, there is only one HTML authoring add-in available to you. Word-Perfect Internet Publisher fits into your existing version of the word processor, but its hyperlinking tools are rudimentary and it doesn't let you browse your hard drive to find graphics files.

Internet Publisher supports Netscape's Navigator extensions. Character and heading styles are easily implemented, and the process of converting your designs to HTML files is simple. Download a free sample from http://gleenet.gmi.edu/software.

#### FILEBOX

#### Internet Publisher Usability \*\*\*

Usability \*\*\*\*
Technology \*\*\*

Verdict \*\*\*½
The solution for HTML editing in WordPerfect 6.1.

WordPerfect/Novell (800) 453-1267

## Web Publishers

Although most Web authoring and administration has been done on Unix systems in the past, the products in this roundup preview the upcoming explosion of Windows-based Web authoring, serving, and mangement tools. By the end of the first quarter of 1996, expect to see more packages for creating a Web site under Windows than under any other platform.

If you want to serve a Web site from a Windowsbased PC, get O'Reilly & Associates' WebSite. This is not an HTML editor, but it's an essential tool for getting a page on the Internet. WebSite will let you manage your Web page easily and intuitively. And this 32-bit Windows app will look very familiar to anyone who has done administration in Windows NT or Windows 95.

If you'd rather set up your Web page and farm out the actual maintenance to someone else, all you need is a Web authoring tool. Because most authoring tools are available free over the Net (albeit in less powerful versions than the commercial products), you can download them all and try them out. They re all very different, and personal preference will play a

key role in your selection. For a stand-alone authoring tool, Brooklyn North Software Works' FITML Assistant Pro is far and away the product to use. Despite an intimidating and Spartan interface, it's a powerful and elegantly simple editor to work with. And using the autocreator, you'll have your own Web page ready to go in second

For ETML authoring from within a word processor, Quarterdeck's WebAuthor for Word is the standout choice, it offers a complete set of HTML editing tools, and it's no different from working on a standard Word file. That said, the Pro versions of all of the stand-alone packages are capable of handling most of what you throw at them. Using either HTML Assistant or WebAuthor will take the headache out of HTML and have your customers surfing to your site in the time it akes to type bttp.

Once your Web page is in place, new customers will flock to see what you have to offer, and the old ones will welcome your efforts. With a Web page, you'll be on the vanguard of corporate communications.



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# Crossroads: EDO DRAM

#### EDO: Clear the Bottleneck

Extended data out dynamic RAM (EDO DRAM) is a new PC memory technology that speeds memory transactions by as much as 10 percent over conventional DRAM. EDO eliminates a wait state between execution of sequential-read commands from memory, giving the CPU significantly faster access to memory.

#### Pros

- Faster delivery of data from memory to processor
- Uses less power, which makes it attractive to notebook users
- Reduces the need for L2 cache in low-cost Pentium machines

#### Cons

 Not compatible with 386s, 486s, and older Pentiums

#### Timetable

By mid-1996, we expect EDO to be the prevalent memory technology for desktop PCs.

#### Opinion

"We anticipate EDO to dominate by the end of this year, and certainly into 1996."

PETE SCAMARDO DIRECTOR OF MARKETING AND STRATEGIC RELATIONS MICRON ELECTRONICS



EDO DRAM: Faster, no-wait-state RAM is sure to take over.

# vs. Conventional DRAM

BY BENJAMIN F. MILLER . ILLUSTRATED BY TIMOTHY EDWARD DOWNS



#### DRAM: Wait for Data

Dynamic RAM, or DRAM, is a common memory architecture found in virtually all current deskton PCs. DRAM requires that the data in memory be refreshed after each transfer While the memory is refreshed, the CPU inserts a wait state between each memory access. This results in slower performance.

· Readily available

#### Cons

· Slower delivery of data from memory to processor · Requires L2 static RAM (SRAM) cache to boost performance

. Uses more power, which means shorter battery life for notebook users

#### Timetable

Because DRAM is installed in millions of PCs worldwide, it will continue to thrive over the next two to three years for upgrades and replacements.

"Conventional DRAM is on the way out. EDO will be the dominant memory architecture for the immediate future." MICHAEL SLATER

PRESIDENT, PUBLISHER, AND EDITORIAL DIRECTOR MICROPROCESSOR REPORT

DRAM: Outdated technology for today's faster CPUs.

# **Help:** Working Smarter

# Woody's Word for the Wise

ome closer, Grasshopper. Here, sit next to the candle. Yes. That's much better. Now, tell me, Grasshopper, why have you made the long trek to see an old fool like me? No, wait. Let me tell you. Your feet are heavy. You walk with the weight of a thousand failures on your shoulders. You cannot sit still. Impatience and frustration keep

your body from resting in peace. The air clings heavy with the scent of your sweat, and your tears.

Ah, I know the symptoms well, I frashoper. The ancient one called it "Word for Windows-itis." On one hand, you have so much work to do, and cannot afford to spend days learning the intriacaies of a fielde word processor. On the other, you keep running into problems that are undoubtedly explained somewhere by some long-forgotten sage, but you have no idea where to look or why things keep going wrong and keep petting worse.

The wise ones who write the holy books assume you understand the problem, and give incantations comprehensible only to the initiated. The jesters with their dumb books make simple things simplistic, but they offer no help when life gets complicated—when the dragons suddenly, inexplicably bare their fangs.

I, too, have experienced this, Grasshopper. My teacher showed me a middle path, so long ago. It's a way of looking into the mind of Word for Windows, to help you understand why and how it is working, that I now pass gladly on to you.

The Document First, let us consider the product of all your efforts, the document. A Word for Windows document is made up of one or more sections. A section contains one or more paragraphs. A paragraph contains one or more characters—including the paragraph mark. In fact, when it comes to understanding Word for Windows' behavior, the paragraph mark is the most important character?

What? Nobody ever told you that? Ahhhh, Grasshopper, Let me open your eyes so you shall understand. The forces of illusion would have you believe that paragraph marks are too complicated for normal Word for Windows users, that they should be hidden from a user's view. I testify before you now that everyone must be able to see their paragraph.

marks, lest they be confused by what appears on the screen.

To make paragraph marks visible, click on Tools, then Options. Bring up the View filecard, and make sure the Paragraph Marks box under Nonprinting Characters is checked. Look and you shall see.

Formatting With paragraph marks visible, you are in a position to understand how Word for Windows handles formatting—in other words, you will find the logic behind the steps you must take to chance the appearance of your documents.

At the highest level—the document you can't change formatting. Instead, the formatting you probably associate with a document—margins, paper size and source,

#### **SNAPSHOT**

GIVE PARAGRAPH SYMBOLS DUE RESPECT

Call Me the Paragraph-Mark Evangelist: It frustrates me to see Word users who turn off paragraph marks because they clutter the screen, at the same time missing out on the powerful features these tiny characters contain. Better to clutter the screen than to deal with unexplainable behavior, which can be a bear to debug and overcome.



Loaded Weapons: Because a paragraph mark contains all of the formatting information from the paragraph it closes, it's easy to carry

those attributes over to the next paragraph by pressing Enter on the paragraph mark. And, if you delete a hidden paragraph mark, you can accidentally remove the formatting. Now You See Them: Whether you see them or not, there are paragraph marks in your document. The important thing is to unhide them. Select Tools, Options, click on the View tab, and select Paragraph Marks under Nonprinting Characters. Don't worry about those weird characters. the Vill grow on you.

Come closer, grassinapper Here, at west to the cmuch belief Nov. left me, grassinapper, with your work losseer and fall with gray "Prix sale Left me te who closer and fall with gray" Prix, sale Left me te shoulders. You cannot all staff impalence and for body from resting the great. The archingt heavy is sweet and your fears "[1] and I lessor the moustoms well, prainfeared. The soots landscape or portrait orientation, and the like—are actually attributes of section formatting. There is no document formatting.

A rassonable person might expect to change these settings with a Format, Document or Format, Section menu selection. Alas, the Word for Windows gold in their infinite wisdom placed those formatting choices under File, Page Setup; If you wish to change document or section formatting, you must look to the West, to the File menu.

At the next lower level-the paragraph-formatting becomes enormously complex. Paragraph formatting options include left, right, center, and justified alignment; left, right, and hanging indents; before- and after-spacing, as well as spacing within the paragraph; tab stops, their type, location, leader characters, and the like; borders and shading; bullets and autonumbering; line numbering; hyphenation; and widow and orphan control. All of that formatting information is stored in the paragraph mark. If you delete the paragraph mark, you delete the formatting information. If you move or copy the mark, its formatting goes along for the ride. If you've ever wondered why a certain change you made to a paragraph—centering it, for example, or defining custom tab stops-gets stuck and propagates throughout a document, it's because you somehow copied an earlier paragraph mark, over and over again.

Mistakenly copying a paragraph mark is easier than you think, Grasshopper. With one exception (which I'll talk about shortly), every time you hit the Enter key, you create a copy of the current paragraph's paragraph mark—with all of the weird formatting intact. Thus, the sins of the father become the sins of the son.

There's an easy solution to the propagate of the propag

At the lowest level, that of character formatting—font, point size, color, spacing, superscript, subscript, and the like—rules are not so complex. Unless you do something to change the formatting (like clicking on the Bold button), each character you type inherits the formatting of the character before. When you type a

**EXPERT TIPS** 

BECOME A WORD POWER USER

- Make sure you have the latest bug fixes. Click on Help, then About to see which version you're using. In the United States call (800) 426-9400. (Outside the United States call your local Microsoft office.) The bug patches are almost always free.
- Keep track of your paragraph marks. Click on Tools, then Options, bring up the View filecard, and make sure the Paragraph Marks box is checked. And don't worry—you'll get used to the way they look.
- 3. Always make backups. It's much easier to delete unused backups than it is to re-create a nuked file. Click on Tools, then Options, bring up the Saye filecard, and make sure Always Create Backup Copy is checked.
- 4. Disable the Insert key. I'm forever hitting this stupid key, and I don't want it to put me in overtype mode. To disable it, click on Tools, then Customize, bring up the Keyboard filecard, and make sure Save Changes In: shows NoRMAL.DOT. On the left, soroll down to All Commands and click on it. On the right, look for Cancel and click on it. Click inside the box that says Press New Shortcut Key and hit the Insert key. Click on Assign, then on OK. This overrides the default overtype action.
- 5. Make AutoCorrect correct. If you ever use the abbreviation "incl." to mean "includes" or "inclusive," click on Tools, then AutoCorrect. Click once on the "incl include" entry (which tells Word for Windows to change "incl" to "include") and click on Delete.
- 6. Keep AutoCorrect current. Word for Windows' AutoCorrect can improve your productivity enormously, if you just remember to stick words that you frequently misspell into the AutoCorrect maw. As you're running through a spelling check, look for good candidates. When you find one, click on Tools, then AutoCorrect, and add the word to your collection while the spelling check is still in progress.
- 7. Give Word for Windows your address. Click on Tools, then Options, and bring up the User Info filecard. Type in your name and address. This information will be used by the envelope feeder.
- 8. Make a conscious decision about Fast Saves. Word for Windows' Fast Save feature makes saving large files much faster by writing out only the deltas—the changes you've made to the file. On the plus side, it's faster. On the minus side, Fast-Saved files are much larger than files saved through the Save As menu, and they contain remants of text you've deleted (which prying eyes can see by using a text editor). Make your choice by clicking on Tools, then Options, and bringing up the Save filecard.
- Show the nine most-recently used files. Why not? It doesn't cost
  anything. Click on Tools, then Options. Bring up the General filecard.
  Down at the bottom, increase Entries to 9.
- 10. Take the tutorial over again. Just click on Help, and pick the Tutorial. You'll be surprised how much new, useful stuff is in the tutorial, whether you've been using Word for Windows for two days or two years.

new character at the beginning of a paragraph, it acquires the formatting of the following character. Because the paragraph mark is a character, if you start typing in a new paragraph the first character you type will take on the character formatting of the paragraph mark.

Now you know much of what there is to know about Word for Windows formatting—and the source, I would guess, of more than half of all the Word for Windows problems most users encounter. Verily, life is suffering, Extinguish your desire for simple formatting rules, Grasshopper, and your suffering will become as but a drop in the ocean of wisdom.

**Styles** So many people feel intimidated by styles, yet styles wield so much power! It has been said that until you understand styles, you do not yet understand Word

#### WORKING SMARTER: Understand the Power of Word's Templates

for Windows. Take the time to learn how to use styles, oh curious one, and your efforts will be repaid a thousandfold.

A style is merely a collection of formatting options that has been given a name. In all the world there are but two different kinds of styles. Character styles contain character formatting, and are applied to (what else?) characters. Paragraph styles contain both paragraph and character formatting. When a style is applied to a paragraph, the paragraph takes on the style's paragraph formatting, and every character in the paragraph takes on the style's character formatting.

Yes, you can "paint" formatting with the paint brush on the Toolbar, but changing painted formatting can be laborious and error-prone. Yes, you can have Word for Windows scan your document and automatically choose styles to be applied, but the computer does not yet have the sense Buddha gave to a slug.

matting and style into your own hands. Practice by placing your cursor anywhere in a paragraph and selecting a style from the first box on the formatting Toolbar (the box that usually says Normal). Then, manually apply the formatting you desire to the paragraph, and type the name of your own style in that box. Apply that style to other paragraphs. See how it works?

The Template Now it's time for the most important part. We have

discussed the document itself, the goal of your enlightenment, and its component parts. I have shown you how those parts can be changed-and explained some of the vagaries of paragraph formatting, the single greatest source of Word for Windows frustration. I have demonstrated the use of styles, Word for Windows' central method for adding structure to otherwise disparate pieces of text, and one of its greatest time-saving capabilities. Now it is time to venture back to the Creation itself, to the locus of each document's veritable big bang-to the template from which each document evolves.

Each time you create a new document. you must select the template on which it is to be based. Like a self-propelled cookie cutter, the template then stamps out an image of itself, which is presented to you as a new, blank document. (If you don't select a template, Word for Windows will choose one for you; it uses a special template, the so-called default or global template, known as NORMAL, DOT.)

Templates are just like regular documents-they can include text, sections, formatting, styles, and everything else a document might contain-plus three items that documents won't hold: Auto-Text entries; customized modifications to toolbars, menus, and shortcut keys (the things you access from the Tools, Customize menu); and macros. That's it.

When Word for Windows creates a new document, it stamps out an exact duplicate of the template you've chosen. Once the new document is ready, Word for Windows doesn't throw out the template-it's

Take matters of for-File Name Template: Tale Created: Last Saved: Last Saved By: Yael L. Ron File Size Revision Number: 9 Total Editing Time: 32 Moute: Last Printed: Statistics Pages Words Characters Paragraphs

Elementary, My Dear . . . If your document looks weird, you may need to play detective; Select File, Summary Info, Statistics. Perhaps you used the wrong template?

kept behind the scenes and used to support the document.

For example, when you open a document, Word for Windows first looks at the document's template to see if it has a customized toolbar. If it does, that toolbar will appear on the screen. If the template doesn't have a toolbar. Word for Windows looks to the global layer-NORMAL.DOTto see if it has a customized toolbar. If none is found there, Word for Windows reverts to using the bone-stock toolbar that ships with the product.

So templates not only provide a cookiecutter pattern from which new documents are made, they also provide a home for customizing features, toolbars, and macros that are unique to all documents created with a specific template. Thus are documents born, and borne.

Remember this fourfold path, Grasshopper, the next time you are perplexed by Word for Windows' behavior: The document, formatting, styles, and the template. Insight will bring serenity to your soul as you scream at the monitor and tear out what's left of your hair. But also consider the great mantra, Om mani padme hum, which is most frequently translated as "Hail to the jewel of the Lotus." Maybe somebody is trying to tell us something? WOODY LEONHARD

WOODY has been embroiled in a love-hate relationship with Microsoft Word almost as long as Kung Fu has been in syndication. His Underground Guide to Word for Windows (Addison-Wesley, 1994) gives the straight scoop on Word for Windows.

#### A WHOPPER OF AN AGG-IN

#### **WOPR 6**

A trial version of Woody's original claim to Word-for-Windows fame, WOPR (Woody's Office Power Pack, pronounced like whopper), is available for download from data library 1 (Windows Programs) on PC Contact (see page 522 for downloading instructions). WOPR extends Word for Windows in dozens of ways, from improved file management to slick one-click envelopes. from Toolbar icon tools to easy booklets. It's won several awards, and drawn praise from satisfied users worldwide.

For a detailed description. drop by the WOPR home page. http://www.wopr.com/wopr. As this article went to press. WOPR was going through a version change. WOPR 6, which works with Word 6 for Windows, can be found in the file WOPR60, ZIP, WOPR 7. which works only with Word 7 for Windows, will be available as file WOPR70.ZIP as soon as Word 7 is released.

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GET READY, get set up, and get going with pointers on installation (358), networking (398), and the Windows 95 Registry (414).

# 95

Here's everything you need to make upgrading to Windows 95 quick and easy. In this exclusive excerpt from Windows 95: Making It Work for You (ZD Press, 1995), by PC Computing's own Matthew Lake and Yael Li-Ron, we'll show you how to unlock the power of the new operating system for total control over file management, multimedia, communications, and applications. And we've selected the very best tips from Microsoft's Windows 95 Resource Kit to help you make your transition a smooth one.



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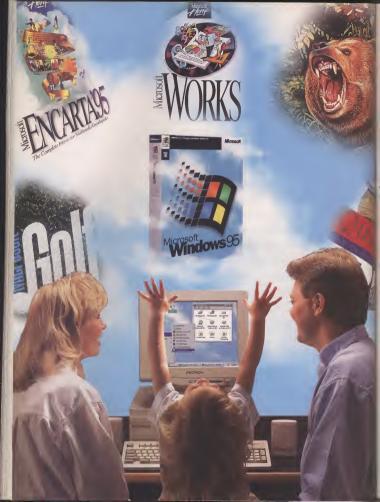
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# Windows 95

MAKING IT WORK FOR YOU By Matthew Lake and Yael Li-Ron

# Housekeeping: File Management

e must break some disturbing news to you. Hope you're sitting down. Here goes: There's more to Windows 95 than a graphical user interface. All that cutesy stuff is only a facade, hiding a complex system intended to make life very easy or infinitely difficult for you. Throughout our book we'll remove the "difficult" part

of the equation. The monster, for the most part, can be tamed.

In this chapter we'll discuss file management, probably the most practical aspect of any operating system. You may never wish to get under the hood and tweak device drivers (who would blame you?), but not a day goes by that you don't do some level of file management. You say, "Not me, I never touch this stuff," but each time you say a file, you do disk magic.

File management skills are crucial to smooth day-to-day operations. The good news is, Windows 95 makes it very easy to work with disks and files. There are several ways to perform any given task—a fact you'll learn to appreciate as you become more familiar with the system. We'll show you all of them, and you'll probably pick one that works for you and stick with it. DOS old-timers, Windows users, and even one that works ow'll all find a comfortable system. If you're new to PCs, more power to you, because you won't be burdened by any hang-ups or preconceived notions about the way things ought to distings ought to about the way things ought to about the way things ought to a bout the way things ought to a bout the way things ought to a supplier of the state of the supplier of the supplier

Because Windows 95 uses a desktop metaphor for its user interface, it stands to reason that your files should be stored in folders. This officelike organization practice should make sense to you (unless your office is anything like our offices). But if you're a dyed-in-the-DOS-prompt old hand, take heart, we'll show you some familiar command-line operations later on in the chapter.

#### The Mother of All Folders

My Computer is the main gateway to your system. Double-click on this icon (we hope that you've renamed it by now) and you'll see several drive icons, with appropriate labels identifying the drive letters. You may not have a 1D drive or even a 1B, but we bet our bottom dollar that you have a C: drive—your primary hard disk drive. Double-click on the C drive icon to display all of its folders. Locate the Windows folder and double-click on it to see more folders. Double-click on the Programs folder. You get the point. You now have several open windows, one for each folder you've opened.

Quick Tip: A vertical scroll bar indicates that there's more to a window than meets the eye. To get to the bottom of the list quickly, press Ctri-End. To return to the top, press (what else?) Ctri-Home.

Click anywhere in the C; drive window—it should be the upper-left one. The title bar changes color to indicate that it's the active window. In the default Large Icon view, the window contains several manila folders, and possibly some other icons, all duly labeled.

#### A Folder with a View

We've already established that you can change the view using—predictably the View menu. For most of your file management needs, the default Large Icons view just doesn't show enough files to be worthwhile—you'll be clicking on scroll bars just to see what else is in the folder, and you're missing crucial identifying information. So click on View, Details to switch to columnar view. The left column—labeled Name—lists the files and folders in the drive. Size refers to files, not folders.

Quick Tip: To learn the size of a folder (that is, how many files and folders are stored in it, plus the total disk space they consume), right-click on the folder's icon and select Properties.

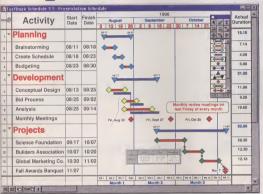
Type is where Windows takes its best shot at identifying files. If the file's extension is .EXE, it's identified as an application. If the extension is something obscure like CH3, the brilliant conclusion is that it's a "CH3 file." Don't worry. Pretty soon we'll explain how to set Windows straight on the true

#### **WINDOWS FIXER**

ELIMINATE FOLDER CLUTTER

You don't need to clutter your Taskbar and desktop with open folders. There's a way to open all the folders in just one window, so that each folder you open takes over the active window and replaces the previous folder. Open any folder, select View, Options, and check the box next to Browse Folders with a Single Window. This is commonly referred to as single-window browse (SWB). You can override the SWB setting anytime by Ctrl-double-clicking on a folder you want to open. If you're set for single window, the new folder will open in a separate window; If you're configured for a "separate" window browse, the new folder will open in the current window.

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### Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

meaning of file extensions. Modified is where you'll see the last date and time a file or folder was edited.

Now is the time to stake your claim on this window: Resize it and move it around until you're comfortable with the way it looks. If you can't see all of the information in a column (a series of periods to the right of the data indicates that the display is truncated), adjust the column width by moving the pointer over the line separating the column headings. When the arrow changes to a cross, drag the line to the right or left until all the data is in clear view.

Elle Edit West Help			
The Monty Python Flying Circu:		N R	n X g
Name	See	Type	Modified
i]Ifa	181K8	Wave Sound	10/1/34 12:00 PM
The knights who say Ni	3K8	Wave Sound	6/1/95 9 52 PM
in This is an expanse.	35K8	Wave Sound	6/1/95 10:02 PM
This periot is no more!	824K8	Wave Sound	5/30/95 7-40 AM
And now for something complet .	881K8	WnZp File	6/2/95 10:20 PM

Any Way You Slice It: To get the optimal view, sort the display by clicking on a column heading, or adjusting any column's width.

This random-looking list is not static. You can sort the display according to any of the column headings. Want to sort the list by file size? Click on the Size column heading, Similarly, clicking on Modified, Type, or Name will sort the list by these categories. The sort is in ascending order, and folders always precede files, regardless of their names.

Quick Tip: To change the sort order, click twice on the column headings.

To keep this or any other view as your default configuration, just close the window. Next time you open My Computer, the window will be in the same position on the screen, and will have the same size and view configuration.

Quick Tip: Let's say you're in a nested folder (a.k.a. a subdirectory) and you want to return to the parent folder, only you've already closed that one. No problem. Press Backspace to go one level up. The last Backspace will get you to My Computer.

#### The Truth About Folders

Folders in Windows 95—just like the nose in your file cabinet—are there to hold information in an organized, sorted fashion. You'd never put all your door ments in the same manila folder, and you don't want to save all your electronic files in one big folder, either. Barring a few exceptions, in DOS-speak, a Windows 95 folder is a directory or subdirectory on a disk. Creating new folders in Windows 95 is as simple as a couple of mouse clicks. As long as you plan this right and keep the hierarchical structure in mind, you'll never be lost.

If you create and place a folder on the desktop, it'll be a nested folder (a.k.a. a subdirectory) within the Desktop folder, which resides within the Windows folder. Let's create one now. Rightclick anywhere on the desktop, select New, move the pointer to the cascading submenu, and click on Folder. Type the name Don't call me a directory! and press Enter. The folder is prominently displayed on your desktop, and the corresponding sub-

directory has been created. Use the same method to create folders anywhere else.

Quick Tip: Need to save a file in a Windows 95 application but there's not an appropriate folder for it yet? Right-click in the File, Save As dialog box's View window, select New, and create a new folder on the fiv.

#### Red Tape

With all those files in sequence: your file cabinet, it's inevitable that you'll have to shuffle some of them between folders, copy a few (don't forget those triplicates!), and shred many others. This one's dedicated to the bureaucrat in all of us.

Copying and moving files between folders can be achieved through menu operations or via the much slicker route—drag and drop. First let's open a couple of folders. Open the Don't Call Me a Directory! folder (what, you haven't renamed it yet?), then double-click on the C: drive icon, and open—in the following order—Windows, Programs, and Accessories. Close Windows and Programs so the only two open windows are Don't Call Me whatever and Accessories.

Dragging an icon between windows constitutes moving it. Let's try this one first. Click on Character Map in the Accessories window, and drag it toward the Don't Call Me... folder. Release the mouse button to drop the icon. You'll notice that the icon has been removed from its home base.

To copy an icon, press Crl while dragging. From now on, we'll refer to this action as Crl-drag. Or you can use the right-drag technique you used earlier to create a shortcut, but instead of selecting Create Shortcut(s) Here from the pop-up menu, pick Copy Here. Make a copy now, just for practice, using whichever technique you like, from Don't Call Me ... to Accessories.

Rodently challenged? Use a notebook and cart get a grip on the trackbill? Try a menu option. Single-click on the Calculator icon, press Ctrl-C, click anywhere in the Don't Call Me window, and press Ctrl-V. To move the icon, press Ctrl-X instead of Ctrl-C. This simple Clipboard operation should be a lifesaver to anyone who thinks that mouse operations are a drag.

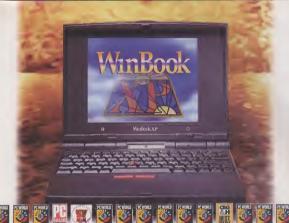


The Flying Folder Show: It may be entertaining at first, but trust us, you'll learn to hate this animated sequence after you've deleted a dozen or so files.

For your efforts, you'll be rewarded with an animated screen depicting flying files or folders.

#### Doing the Ollie North

There are two ways to delete files: macho and wishy-washy. The macho approach removes them permanently and irreversibly—and frees disk space in the Continued on page 200





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## Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

Continued from page 196

process. The wishy-washy (although, admittedly, more sensible) method places them in Recycle Purgatory until you decide whether they should really be removed or revived—sacrificing some disk space along the way.

The Recycle Bin icon on your desktop represents the mechanism that manages your deletion preferences. By default, Windows 95 places deleted files in the Recycle Bin, from which you can either purge or undelete them if you want. To delete a file, click on its icon in My Computer or Explorer and press the Delete key on your keyboard. You'll be prompted to confirm the deletion, and the Recycle Bin icon will change accordingly. Latert, you'll need to clear the Recycle Bin is contents. If you'd rather use the mouse, you can also drag icons to the Recycle Bin sometime.

Quick Tip: If you're sure you want to delete a file and want to save yourself the extra step of clearing the Recycle Bin's contents, just press Shift-Delete instead of Delete, and it's gone forever. Shift-dragging files to the Recycle Bin does the same thing.

#### **Taking Out the Garbage**

To clear the Recycle Bin's contents, right-click on its icon and select Empty Recycle Bin to remove all the items in one fell swoop. Alternatively, you can go through the trash and select items to purge or undelete, as follows:

Double-click on the Recycle Bin icon to open it. Surprise! It's just a folder like any other folder. But notice the data columns: They're a bit different, listing the deleted files' original locations and deletion dates. To purge a file, click on it, then click on the X button on the toolbar. Alternatively, right-click on the file you want to purge and select Delete. To undelete a file, click on it, then click on the Undo Delete button on the toolbar (it looks like a curved arrow), or right-click on the file and select Restore. The filename will be removed from the Recycled Bin folder and placed in its original location.

Caution: Windows 95 makes it far too easy to remove entire folders along with their contents. Just click on a folder, hit the Delete key on your keyboard, and, poof, all gone. The resulting dialog box defaults to Yes, so pressing Enter confirms your intentions.

#### Under the Lid

What really takes place when you send files to the Recycle Bin? It's actually pretty straightforward. In a weird, convoluted way, that is. Recycle Bin moves files you want to delete to a hidden \RECYCLED directory (or folder) on that disk and renames them. If the drive is C:, the files are named CD0, CD1, CD2, and so on. On the D: drive, the files are called DDO, DD1, DD2-vou get the idea. The information on the files' original names and locations is kept in a file in that directory, so when you select File, Restore, the file you want to undelete is renamed with its original name, moved out of the \RECYCLED directory, and put back in its original directory. At press time, there was no way to undelete

from floppy disks or other removable media. (See "Demystifying the Recycle Bin," page 202, for more information on the Recycle Bin.)

#### All Together Now

It stands to reason that you'll often want to copy, move, or delete a bunch of files at a time. Not surprisingly, you can select several icons, either adjacent ones or some that are spread apart. To select a group of adjacent icons, single-click on the first one,



Environmentally Correct: You can configure Recycle Bin settings for each drive individually—or do it globally.

then Shift-click on the last one. To

select noncontiguous icons, single-click

on the first one, then Ctrl-click on any

-----

additional ones.

Eight-Dot-Three No More

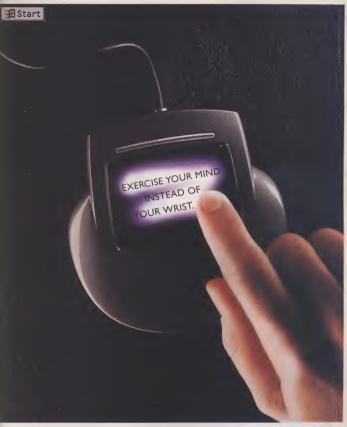
If you've been using DOS or Windows for a while, you know that filenames are limited to eight characters, plus a threecharacter extension following a period. This, for longer than we care to remember, has been referred to in professional literature as FILENAME.EXT. Not only has this caused numerous headaches to users everywhere as cryptic names like MD 9 R.BRD stop making sense about an hour after you've come up with them-let alone a year later-but several keyboard characters are forbidden in that archaic naming scheme (+/\: % \* ? < >, and, worst of all, a space). Users have practiced some highly creative solutions over the years, which basically involved truncation and elimination of vowels, to a point where disk files look like phrases from some exotic Slavic language. (How do you pronounce CHKDSK again?)

The welcome addition of long filenames to the Windows 95 file system has eliminated this limitation. Well, sort of. The new virtual file allocation table (VFAT), which is the 32-bit file management system in Windows 95, sees to it that files are still saved to the disk with that old naming convention, but you can now control the way they're displayed in a folder window.

#### **WINDOWS FIXER**

TRASH IT

The Recycle Bin is an excellent safety net for those times when you delete files you don't really want to get rid of. If you don't want to be hothered with this extra step, disable the Recycle Bin so that each deletion will be permanent. To do so, right-click on the Recycle Bin icon on the desktop, and select Properties. Click next to the Do Not Move Files to the Recycle Bin option, select Apply, and you're flying without a net. Note that if you have more than one drive, you can set the same option globally for all drives, or configure each separately.



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#### **GUIDED TOUR**

#### DEMYSTIFYING THE RECYCLE BIN

Straightforward: When you delete a file, Windows 95 renames it and moves it to a hidden directory called RECYCLED. There, a hidden binary file called INFO stores the original filename and path. The Recycle Bin is an extension of the user interface. That's why it takes a few seconds to delete files in Explorer. But in a DOS window, you can delete without a delay because the Recycle Bin is not active there. Files you delete at the DOS prompt can still be unerased with utilities such as Norton Utilities because the file allocation table (FAT) works the same way it always has



Space Savers: You can turn the Recycle Bin off or reduce its maximum size. Rightclick on its icon and select Properties.



Oops: To restore files from Recycle Bin, open it, select the files, and click on the Undo button. Or select Undo in the folder from which the files were removed.



Same Thing: The \RECYCLED directory contains all the files in the Recycle Bin. To see the hidden file INFO, type DIR/AH at a prompt.



Safety Net: This dialog box defaults to Yes, so go easy on the Enter key. If you don't want to see this warning, turn it off in the Properties screen.



No Warning: Use DEL at the prompt and files don't move to the Recycle Bin—and you don't get a dialog box to confirm your actions.



Purge: To empty the Recycle Bin's contents, right-click on its icon anywhere and select Empty Recycle Bin.

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## Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

Continued from page 202

Some limitations still exist. While we're finally allowed to use spaces, and names can be as long as 255 characters (a silly allotment, really, but grab it quickly before they change their minds and revert to eight-dot-three), the following characters are still taboe: 2\* <>/>: \*<>/>:

The folder Don't Call Me a Directory! that we created earlier has been saved to your hard disk as DON'TC-1. Still pretty lame, but the good news is, the operating system now does the truncation for you, and unless you go to a DOS prompt, you'll rarely see this low life-form.

The cardinal rule of Windows 95 file management is: There can never be two identically named files in the same folder. So even if you create a desktop folder called Don't Call Me a Directory!—The Sequel, Windows 95's file naming mechanism will handle the truncation intelligently. Rather than DON'TG-1, which is an existing name, the new folder will be saved to disk as DON'TG-2. This gives you the freedom to name folders and files anything you want. But if you attempt to create a second folder with the name Don't Call Me a Directory! in the same place, Windows 95 will give you a piece of its mind.

#### Like File Manager on Drugs

In Windows 3.x, there was only one place you had to go for all your file management needs—File Manager. This less-than-adequate utility single-handedly created a thriving cottage industry—

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File Manager It Ain't: Explorer puts everything into a tree—even the contents of your Desktop.

making File Manager replacements. Anything was better than the original File Manager. At first sight, Explorer looks a little like File Manager with a few additions. But this is no ordinary File Manager—this is File Manager on steroids.

Ouestionable drug habits aside, Explorer flexes some very impressive muscles. Explorer is the hub of Windows 95's file management. It employs a slightly different approach than My Computer, offering a split-screen view that gives you more power and flexibility than the folder windows could ever offer. Since you'll likely end up using Explorer more often than My Computer, let's make room for it on the desktop. That's right, another shortcut: Right-click on the Start button and select Explore, double-click on the Programs icon, right-drag the Explorer icon to the desktop, and create the shortcut. This should be second nature by now, so place the icon anywhere you want, and name it anything that makes sense to you.

#### No Pane, No Gain

Open Explorer and you'll see a familiar screen. The right pane looks just like any other folder window. The difference is in the left pane, which shows the hierarchical structure of your entire system. Yes, every drive and folder, all in one place. Click on any of the folders on the left to show its contents in the right pane.

A plus sign next to a folder in the left pane indicates that there are more folders nexted within it that are not currently in full view. Click once on the plus sign and the folder's contents will become visible. A minus sign, obviously, means you're looking at the entire contents of the folder. Click on plus or minus to expand or collapse a level. This hierarchical view is commonly referred to as a tree structure. To jump up between branches, click on the Up One Level button on the toolbar or press Backspace on your keyboard.

Quick Tip: Press the plus or minus keys on your numeric keypad to expand or collapse the current folder. To expand the entire tree, click on the Desktop icon and press \* on the numeric keypad.

Can't see the forest for the trees? Finding a specific drive or folder can be timeconsuming unless you know the trail. To



Easy As Pie: Before copying files to a floppy disk, right-click on its icon to make sure there's enough room.

quickly get to any folder—anywhere on your system, regardless of the driver type the first few characters in that folders's name. Typing so won't get you far if you have folders called Windows, Word-Perfect, and World Cup. To get to Windows, type win. Unless, of course, you have a folder called Winword, in which case you'll need to type wind for the best match. You must type fisst, though. If you type w and rest for a second, Windows 95 will take you to the first folder that starts with that letter. The idea is to type as fast as it takes to beat Windows 95.

**Quick Tip:** If you're in a folder window and want to switch to Explorer, just right-click on the Control menu and select Explore.

To copy files between folders or drives in Explorer, all you need are some basic hand-eve coordination skills. For example, let's say you want to copy the file FORMAT.COM from the Command folder to a disk in the A: drive. In the left pane. type com to get to the Command folder. Click once on the Format File icon in the right pane, then use the left pane's vertical scroll bar to scroll up until you see the A: drive icon. Drag FORMAT.COM from the right pane to the A: drive icon and you're done. Remember not to click on the A: drive icon, as the right pane will display its contents and you'll lose your place in Command.



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## Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

#### Mix 'n' Match Time

Don't forget that the A: drive has a shortcut on the desktop, created, if you followed our advice, in "I Wanna Be Like Mac" (below). You can drag a file from Explorer to that icon, an action that requires less mouse precision. In fact, you can also copy or move files or folders between Explorer and a folder window.

We've talked about selecting groups of files in folder windows. The same practices apply in Explorer: Ctrl-click for noncontiguous selections, and Shift-click for adjacent icons. When you select several files to move or copy to a floppy disk, you may want to first preview your selection to make sure that the files don't exceed the disk's capacity. Just right-click anywhere on the selected files to get the Properties menu and check the total disk space they occurry.

While you're at it, you can mark selected files as Hidden or Read Only for extra protection against snoopers or bloopers. This, of course, applies to single files as well as to groups.

Quick Tip: When you copy files or make other changes to the contents of a folder, the display doesn't always immediately reflect your change. To refresh the view, bit F5.

#### File-Owner Association

To enable quick launching of files from the desktop or any folder, you can establish an association between documents and the applications that created them. For example, Word for Windows' default document extension is DOC do double-elliciting on any filename that includes that extension will launch Word and open that document. But what if you regularly save Word documents with the extension TTL? As far as Windows 95 is concerned, this is an unknown format, and you won't be able to open the file by double-clicking on it-unless you establish an association, that is, To do so, click on any filename with the extension you want to associate, select View, Options, click on the File Type tab, and click on the New Type button. In the resulting dialog box, enter a description for that extension (for example, .TTL may stand for Transatlantic Travel Log), and type the extension in the Associated Extension box Now click on New to find the application, type OPEN in the Action box, and type either the application's filename and complete path (C:\WIN-WORD\.EXE, for example), or click on Browse to find it on your hard disk. Click on OK, then on Close.

When you open the File Type screen again, you'll notice that the Transatlantic Travel Log file type has been added to the list of associated extensions, and that it's associated with Word for Windows.

Quick Tip: You can also create an association by right-clicking on an unassociated file type and selecting Open With. Make sure there's a checkmark next to "Always use this program to open this file."

#### A File with a View

Sometimes you just want to take a peek at a document and don't want to waste too much time opening it along with its associated application. Windows 95 comes with several viewers. There are viewers for word processors, spreadsheets, a few graphics formats, and more. While opening Excel with a worksheet may take a



Free Association: Removing associations is as easy as creating them in the same dialog box.

minute (or longer), quick-viewing the same worksheet takes a matter of seconds.

**Quick Tip:** When you establish an association, be sure to check the Enable Quick View option.

Look at the filenames in any folder's Detail view. Some include extensions, others don't. In reality, probably more than 90 precent of your files include an extension of some sort, but not all of them show up in this view. A bug, you say? No, Wickension 59 does that intentionally. Any extension for which an association has been created is promptly removed from the display. This makes it easy to determine whether you can double-click on a file to launch it.

But if you want to view all your extensions, it's a simple user-selectable feature. Just select View, Options, and click on the View tab. Deselect the box next to Hide MS-DOS Extensions for file types that are registered. The registration referred to is in Windows 95's internal Registry database, where all associations are recorded.

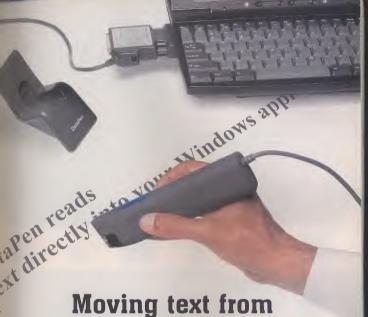
While you're there, note the option Hide Files of These Types, above the file list window. This is intended primarily to protect you against yourself. These file extensions stand for crucial system files, and the less you see them, the less likely you are to delete or relocate them. Most of the time, it's probably safe to leave this option selected. The only exception is when you want to delete all the files from a folder or disk because hidden files

Continued on page 218

#### WINDOWS FIXER

I WANNA BE LIKE MAC

One of the most agonizing emotional disorders for PC Users has long been referred to as MacEnvy. This syndrome is fairly easy to diagnose: The patient wants his or her PC to be like a Macintosh. And who could blame them? System 7.x and even earlier versions of Macintosh operating systems have defined user-friendliness. Windows 95 tackles this issue on several fronts, but what's still missing on your Desktop are icons for each of your drives (floppy, hard disk, and CD-ROM). Don't just sit there feeling sorry for yourself. Macintize your display by creating drive icons. Open My Computer and right-drag each of the drive icons to the desktop.



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Now You See It: The best thing about Quick View is that you don't need the originating application on your system to peek at a file.

won't be deleted. So turn this selection off before you delete the files, and reactivate it when you're done.

#### Launching Unassociated Files

Setting associations is one way to ensure a quick launch of a document with the application that created it. But if you're like most people, you probably have too many extensions in your word processor's document folder. some too obscure and not worthy of their own association entry in the Registry. You can still quick-launch those documents with a simple trick: Rightclick on any icon, and you'll see the Send To option in the ensuing pop-up menu. The Send To menu is a snapshot of the Send To folder, which resides within the Windows folder and contains shortcuts to any application to which you'd like to "send" unassociated documents. Go to that folder and add a

Upen Quick View Add to Zip	
Send To	≥ 3½ Floppy (A)
Cut Copy	Collage Image Manager Misc. Book files
Create Shortcut Delete Rename	WinWord
Properties	

Homegrown Menu: Set up the Send To menu yourself by dragging a few shortcuts into the Send To folder.

shortcut to your word processor and any other application you want. You can also add shortcuts to drives and folders, but remember that when you send a file to a floppy disk it gets copied, while a file you send to a folder gets moved.

Quick Tip: To quickly print a file, use the Send To option to send it to the printer. The file must first be associated with an application, because Send To print jobs are remuted through applications.

#### Needle in a Haystack

No clue where you've stored that file? Or what you called it? Or exactly how you spelled its name? Welcome to the wonderful world of 500MB hard disks, where any file is likely to vanish without a trace. The more you work in Windows 95, the more

folders you'll have, and the more frustrating it will get to rummage through multilayer storage schemes. A modestly named utility called Find comes to your rescue. Homebased in the Start menu, Find lets you specify whether you're looking for files, folders, or even another computer on the network. Tell Find what you're looking for, and it'll search your entire system. Let's try it:

Press Ctrl-Esc or click on the Start button. Select Find and then Files or Folders. In the Name and Location screen, type a filename. If

you don't remember the filename, but want to search for text embedded in it, leave the Named box blank. For a partial match, you can type something like my, which will yield all the files on your system whose names contain my. Click on the drop-down arrow next to the Look In box, and select My Computer-or whatever you're calling it today. Click on the Date Modified tab, and narrow the search by date. Select the Advanced tab, and type any text that you think is embedded in that file. This won't be a

case-sensitive search unless you select Options, Case Sensitive, Click on Find Now and watch the search party look under every rock in your system. Well. almost every rock. If that text is embedded in an archived (zipped or otherwise) file, Find won't find it.

Quick Tip: Want to limit your search to the subdirectories under Windows? Click on the Browse button in the Name and Location screen and double-click on the Windows folder

When you get a list of matches ("hits," in computerspeak), you can sort it by clicking on the column heading (Name, In Folder, Size, and so on), You can even launch any file from that list by double-clicking on it, but only if its extension is associated. Sound familiar? This is a mini folder view.

Quick Tip: To start Find while in Explorer or My Computer, press F3 or Ctrl-F. On the Desktop, only F3 works.



Seek and Ye Shall Find: If you don't remember where you saved a file or what you called it, set FIND loose on your system.

#### That Good Ol' Prompt

Underneath Windows 95's pretty new face you can still find the old familiar DOS prompt. For command-line veterans, it's still the fastest way to work. Do you really need to see flying files and folders whenever you copy or delete? If you're a macho geek like we are, that's just fluff. You just can't beat the rush you get when you type such deliciously cryptic commands as COPY BUD?CH.\* .. VFALL93. Fortunately, most old DOS commands still work in the same way. To get to a prompt,



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# Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

#### GUIDED TOUR

MAKE YOUR OWN SEND TO MENU

Own It: One of the options you get when you right-click on most icons in Windows 95 is the Send To menu. This is where you "send" files to the printer or Briefcase, but there's more to it than that. You can send (that is, move) files to specific folders—especially handy when you're working on a project. You can also launch applications by right-clicking on unassociated files. The process is simple. There's a Send To folder inside your Windows folder, and in it you place shortcuts to items you want to send stuff to.



Easy Access: Right-click on an icon and a Send To option cascades into different tasks to which you can send the object.



**Drag and Done:** Quickly launch Word by sending unassociated files to it. Right-drag its executable file to the SendTo folder and select Create Shortcut(s) Here.



Sneakernet-Ready: Create a shortcut to your A: drive by right-dragging its icon from My Computer. Files you send to it will be copied.



Behind the Scenes: The SendTo folder holds shortcuts that correspond to the existing Send To menu.



No Dragging: Rather than dragging a shortcut, you can right-click in SendTo, select New, Shortcut, and follow this wizard.





**Done:** Why are PaintBrush and Write here? The former for opening PCX files (which Paint doesn't support), the latter for reading binary files (which WordPad won't).



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(time in minutes/seconds)

00:20

00.40

00:60

01:20

01:40

02:00

02:20

02:40

03:00

03:20

RLN 00:26 LAN-ROYER 01:44 01:44 HOST INFO ACCESS

SOL DATABASE APP

(time in seconds)



00:01 00:02 00:03 00:04

00:04 00:05 00:06 00:07

00:08 00:09 00:10

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## Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

Continued from page 220 select the Start menu, then Programs, then MS-DOS Prompt.

Quick Tip: Create a shortcut to the DOS prompt—right-drag COMMAND..COM from the \WINDOWS\COMMAND folder to your desktop.

Let's check out some of the basics. Want to see the listings of all the files in this directory? (Note: Here they're called directories, not folders.) Type DIR and press Enter. OK, so that zoomed by too fast. In the old days, you could type DIR/P (for pause), in order to read anything without getting cross-eyed. But Windows 95 provides a handy vertical scroll bar so you can move back and forth to see what you've missed. You can still type DIR/P, of course. The difference between this DIR listing and the traditional DOS one is in the rightmost column: This is where long filenames are displayed. The truth is, long filenames are not really filenames, but rather special directory entries, managed by VFAT.

Not sure what else you can do with the DIR command? Type DIR? and you'll get a crude help screen. In fact, typing? after any command-line command will give you its help screen.

Quick Tip: Want to copy text from a DOS window to a regular window? Click on the Command icon and select Toolbar. Now you can easily select text with the mouse and copy it to the Clipboard.

Save for a few system configuration folders such as Printers and Control Panel, most Windows folders represent directories and subdirectories on a disk. Why do you care? You probably shouldn't. This momentous bit of trivia is meaningful only to DOS prompt users. If you remain within the comfort zone known as the desktop, this is truly insignificant to the way you work. But hold on to this information, it'll come in handy at a cocktail party.

Moving between directories is another familiar feat. You can still use the same old CD (change directory) command, but Windows 95 has added a little punch to it. In earlier DOS versions, while navigating the tree structure, you could move one level up by typing CD., (that's two periods), but now you can also type three periods for two levels up, four for three levels up, and so on. Let's see if you're paving attention: How many periods do you type for ten levels up? Wrong. That would be silly. If you have such a convoluted structure, rethink it. Your hard disk will grind and whine as it goes searching for such a deep-nested structure. Besides, you can easily type CD\ followed by the directory name you want to reach instead of all those periods. But three or four periods, that's a different story.

Another thing you can do from the DOS prompt that you could never do before is launch Windows applications. That's right. Just type the application's executable filename, and it runs as if you've double-clicked on its icon in Explorer or on the desktop.

Oh, and about that long, cryptic command your fingers are just itching to type: Forget it. Just go back to Explorer and practice some dragging and dropping. Unless you're looking forward to carpal tunnel syndrome, that is.

#### **Running Batch Files**

Batch files are simple programs users write to automate certain tasks. They've been

around since the early days of DOS, and the surprising thing is, they're still here. Yes, it's true. You can still run batch files, whether from a DOS prompt or through the graphical interface. What if you often need to launch three applications together for a certain project? Just write a batch file and run it whenever you need to work on the project. Use WordPad (and make sure vou save the file as

a Text file), or go to any DOS prompt and use EDIT to create or modify your batch file. For the sake of this example, create a file called PROJ95.BAT and type the following lines into it:

C:\PROGRA~1\ACCESS~1\MSPAINT C:\PROGRA~1\ACCESS~1\WORDPAD

This will launch Paint, followed by WordPad. The odd thing, in this brave new GUI wordld, is that Windows 95 has given batch files a face-lift. See for your-self—add a shortcut to PROJS-BAT to your desktop, and right-click on that icon to see its properties. Here you can specify whether you want the batch file to run in windowed or full-screen mode, with or without a toolbar, and more.

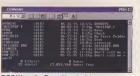


BATman Lives: Batch files in the past? Check a batch file's properties—there's still life in old DOS scripts.

Quick Tip: To close the DOS session after you run the batch file, be sure to select the Program tab in the batch file's Properties dialog box, and check the Close on Exit option.

#### Speedier

If you're tired of flying animated icons whenever you copy or delete a file, use the COPY or DEL command at the DOS prompt. But be warned: You can't undelete files you remove with DEL or overwrite with COPY. Most of the old DOS commands—internal as well as external—are still available at the command lime. To see the familiar DOS files, check out the WINDOWSCOMMAND fold ... erry, directory.



**DOS Were the Days:** You don't have to miss the old command line. Go to a DOS prompt and type any cryptic command your heart desires.

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## Windows 95 MAKING IT WORK FOR YOU Housekeeping: File Management

To close the Command window manually, click on the Close button, or, better yet, do the geeky thing and type Exit.

Space, the Ever-Shrinking Frontier Computer users have an insatiable appetite for hard disk space. And we can't blame you. With applications averaging 30MB of your precious real estate, it's easy to see why a 500MB hard disk (at a minimum) is a necessity. And no matter what you do, you'll run out of space faster than you can say, "But I just bought this hard disk!" So here are a few things you can do postpone the inevitable.

Compress Files File compression is as close to voodoo as you'll get. You take perfectly good files, dehydrate them, and they still look and behave the same. Compression is a technique whereby all the redundant parts of a file are replaced with tiny pointers. Windows 95 comes with a compression utility called DriveSpace, which can compress entire hard disks, resulting in virtual higher-capacity disks. There are different places where you can apply Drive-Space: on existing files, resulting in more available drive space; on available space on a drive, but not on the installed files, resulting in a new virtual drive; on a new, empty drive; and on floppy disks.

Caution: Although DriveSpace is relatively safe, you should back up all of your crucial files before you run it, using the Backup utility (Start, Programs, Accessories, System Tools).

To run DriveSpace, open the Start Menu, then Programs, Accessories, System Tools, DriveSpace. Click on the drive you want to compress and select Drive, Compress. The resulting screen will give you an estimate of the space you'll gain. To run DriveSpace on empty disks, select Advance, Create Empty.

Quick Tip: The estimated compression is just that—an estimate. Files compress at different rates (bitmap files compress much better than program files, for example), so DriveSpace can't accurately predict the outcome, but it does come pretty close.

Once you've compressed your disk and gained that extra space, you'll be surprised to see that your files are still the



Is This Legal? DriveSpace gives you hard disk space you never paid for. Why can't real estate work this way?

same size they were in Explorer, But that's just an illusion. In reality, the compressed volume is a virtual drive hidden in My Computer or Explorer, That drive contains one big file, which is the consolidation of all your files. If you really want to see that file, run DriveSpace, click on the Host Drive for Drive C (or whatever letter it is), and select Drive, Properties, and uncheck the Hide This Host Drive option. Be sure to rehide this drive when you're done browsing, because leaving it exposed is too dangerous-if you delete the DBLSPACE.000 file, you'll wipe out your entire hard disk. That file may also be called DBLSPACE.001, DBLSPACE.002, and so on, depending on the number of drives you've compressed (000 is your first one).

Compress Floppy Disks
Although flooppies can be
compressed just like hard
disks, you need to mount
them whenever you want to
use them. Without mounting,
Windows 95 can't read the
disks. To configure DriveSpace to mount disks automatically whenever you
access them for the first time,
Choose Advanced, Settings
in the DriveSpace dialog box.

Caution: Windows 95 won't mount disks automatically if DriveSpace is open. Select Advanced, Mount, to mount disks manually.

Disable Recycle Bin As we said earlier, the Recycle Bin reserves some disk space for the files you've marked for deletion. Say you have a 500MB hard disk, and the default setting sets aside 10 percent of your disk space for Recycle Bin—that's a whopping 50MB!

Your choices? Either disable Recycle Bin altogether by right-clicking on it and selecting Properties, or adjust the slider from 10 percent to 3 or 4 percent.

Format Disks Unlike the early days of computing, when you needed to format new disks (a truly no-brainer but time-consuming operation), when you buy loppy disks today, they come preformated. So why bother learning to format with Windows 95, you ask? Simple. Data integrity on floppy disks tends to deteriorate over time, and you can lose important files stored on them. Formatting gives disks a shot in the arm. It also wipes them out, but coldly enough, that 's the coint.

To format a disk, right-click on the drive's icon in Explorer or My Computer, or on its shortcut on the Desktop, and select Format. You can chose between a Quick Format, which erases only files, and a Full Format, which escans the disk's surface and rebuilds the FAT. You can also transfer the system files to the disk to make it borable.

Quick Tip: If the floppy disk has been compressed and mounted by Drive-Space, you can't use the standard Format command to format it. Instead, run DriveSpace and select Drive, Format.

Drive Advanced Help	
Drives on this computer:	
3½ Floppy (A:)	3.5" Floppy drive
(C)	Physical drive
(D:)	Physical drive
(E:)	Compressed drive
<b>-</b> (F)	Compressed drive
(G:)	Physical drive
Host for e (I:)	Host drive for drive E (hidden)
Host for f (J:)	Host drive for drive F (hidden)

Spot Reduction: Nervous about compressing everything? You can choose to compress one drive and leave another untouched.

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# Sight and Sound: Multimedia

ultimedia. Ah, yes. There's a word to conjure with.
Back in the 1970s, multimedia events took place in large auditoriums filled with yards-high projection screens for slides, movies, and light shows; megawatt speaker systems for playing overproduced soundtracks and amplifying self-consciously artsy musicians; and a stage for

singers and poets with no sense of rhythm. That was more than 20 years ago. Now multimedia events take place inside your PC—generally over single-watt speakers and in only part of a foot-high screen. And believe us, this is progress.

For a decade or so between the excessive 1970s and our current urbane and sophisticated cyber-era, nobody was quite clear on what multimedia meant. Then the Multimedia PC Marketing Council appeared. Based in Washington, D.C. (so it must be important), this body defined minimum specifications for multimedia PCs and licensed its trademark to 170 hardware wendors.

Although the specs were updated to MPC 2 in 1993 and MPC 3 this year, they're still worfully inadequate—but they make a good starring point. The MPC specs call for five components a PC (this always helps), a CD-ROM drive, a version of Windows later than 3.0, a sound board, and speakers or headphones to hear the audio output. The requirements are actually more complex, but for the purposes of this chapter, we'll assume that your system contains this kind of hardware. (Let's face it, it's shard to buy a new system nowadays that doesn't.)

But if you don't have a multimedia system yet, don't tear out this chapter. Get a multimedia upgrade kit (they're available via mail order for as little as \$200 to \$300, and once you've experienced the peculiar hell of installing one, they're a lot of fun). Then read on.

One thing the MPC Council doesn't tell you is that you absolutely must have a modem. And a fast one at that—no slower

than 14.4Kbps, and if possible, 28.8Kbps (V.Fast). There are two reasons for this added expenditure (other than the fact that you're otherwise left behind in today's cyber-craze): First, wonderful multimed forums are available on America Online, CompuServe, (and soon the Microsoft Network) as well as other online services (to say nothing of the Internet). These offer support and resources for MPC users, and let you talk to other sight-and-sound enthusiasts about this newfound passion of yours. Second, you can download sound and movie clips to last you until the next, well, hard disk (these files are huge).

#### Multimedia Fanfare

You're in a strange building. In the corner of a room, there's a computer. How do you know whether it's an MPC system or not? Even if you ignored the CD-ROM drive (the only drive with a built-in volume-control wheel) and the speakers, you could always flip the switch and wait for Windows to boot. If it's a multimedia machine, edds are it will sing to you.

#### **WINDOWS FIXER**

RECOMMENDED MPC SPECS

**Forget MPC Level 1:** It just doesn't cut it anymore. As for the other two specs, the MPC Marketing Council has a few ideas. We have another.

	MPC Level 2	MPC Level 3	We Recommend	
RAM (min.)	8MB	8MB	16MB	
CPU	25MHz 486SX	75MHz Pentium	66MHz 486DX2, Pentium preferred	
Hard Drive	160MB	540MB	750MB	
CD-ROM	Double-speed, at least 400ms seek, multisession, 64K onboard buffer	Quad-speed, at least 250ms seek, multisession, "Red Book"-capable	Quad-speed, at least 200ms seek, multisession, 256K onboard buffer	
Sound	16-bit digital, 8-note synthesizer, MIDI, IMA's ADPCM compression support	16-bit digital, multivoice internal synthesizer capable of 6 simultaneous voice and 2 percussion tracks	16-bit digital, multivoice internal synthesizer capable of 6 simultaneous voice and 2 percussion tracks	
Video	At least 640 by 480 pixels, 65,536 colors, 1.2-megapixel delivery at 40 percent of CPU bandwidth	30-frames-per-second video at 352 by 240 pixels, MPEG 1 compliance	64-bit acceleration, 1,024- by-768 to 640-by-480 resolution, from 18.7 million to 256 colors, 2MB to 4MB DRAM, VRAM if possible	



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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

#### WINDOWS FIXER

TURN UP THE VOLUME

If your startup sound is too soft (or you can't hear it at all), check the tray at the far right of your Taskbar. If your sound card is directly supported by Windows (nearly all the ones from Creative Labs, Media Vision, Aztech, and Compaq are, plus several others), you'll see a loudspeaker icon there. If it's enclosed by a red circle, the Mute button is on. If not. it's probably on too quiet a setting. Click on it once with the left mouse-button. A little window pops up with a volume slider and Mute check box. If the Mute check box is selected, click on it to clear the X. To increase the volume, drag the slider up. When you release the mouse button, Windows will beep so you can sample the sound level.

Actually, the hundreds of extra dollars spent on multimedia components are too often celebrated by a tuneful little fanfare when the PC is turned on, and the rest is silence (until you make a mistake or quit).

Just as it was under Windows 3.1, the Windows 95 sarrup sound is a file with the extension WAV (for sound wave), sored in the Windows Media folder. Windows plays it because it's associated with a system event (in this case, Start Windows). The same is true of all the other system sounds, which—unlike in Windows 3.1—an he saved in different schemes that you call up when you get tired of the same old tunes. That's what we'll look at next.

#### Catch a WAV

The Windows startup sound gets old, the fanfare when you quit Windows alerts

Books Province Company Coll College Co

Just Shut Up! When—not if—Windows 95's sounds get on your nerves, assign new ones with Control Panel's Sounds.

anyone in earshot that you're about to quit (a bad idea), and then there's the

annoying high-pitched ping that alerts you if something's seriously wrong. Or there's the irritating chord that's a note of minor problems. Yep, they've all got to go.

Each of the default sounds is created by one of five files stored in the Media folder (which is in your Windows folder), namely, Microsoft's SOUND.MAY, TADA.WAY, CHIME.WAY, DING.WAY, and CHORD.WAY. Sounds were associated with events when you installed Windows in the first place. And like every-

thing Windows sets up by default, it was put there for you to change. Get into My Computer, start Control Panel, and click on the Sounds icon.

The current scheme will most likely be the Windows Default Scheme, which dictates that sounds will occur when selected events are triggered. Check out the Events list box. Except for the lines that start Windows Exit and Windows Start (right at the bottom), there aren't many clues as to what each of the events means. And it's difficult to see which events have sounds attached—unless you select an event and check the window's File box to see if a sound is listed.

Quick Tip: If you installed all the sound-file options when you set up Windows, you'll have about 7.5MB more files than you need. Once you choose a sound scheme you like, delete the superfluous files—or save

them in smaller formats.

#### Sounds Familiar

Once you're in Control Panel's Sound properties buy, you can do more than just check out the associations. You can select new ones. You might want to try you some of Windows 95's other sound schemes (Musica, Jungle, or whatevry), although they tend to make distracting noises much too often (a noise when you minimize a window? Pub-leezee1).

Quick Tip: If you don't see any other sounds in the Schemes box, and you'd like some, go into Control Panel's Add/Remove Programs, click on Windows Setup tab, and scroll down to



CD-ROM into your drive, and up pops CD Player complete with a track listing, if you've typed one in.

Multimedia. Double-click on it, and pick a new sound scheme at will.

Programs like Schedule+, WinCIM, and Microsoft Mail have a tendency to throw themselves into the association mill To change them, read on

mill. To change them, read on, Select an event in the Events list. The default beep is a good place to start because it's an annoying sound. To assign no sound to an event, click on the Name dropdown box and select None. Otherwise, click on Browse, In the Browse for Default Beep sound dialog box, you're dropped into the Windows Media directory. Try out some of the sounds by selecting a file at random and clicking on the Preview Play button. When you're satisfied with your choice, click on OK. Repeat the process for any other sounds that bother you, then click on Save As and save your new assignments under a new name.

Windows 95 is here. And it's

Except for one thing: it doesn't include any anti-virus protection. And your old anti-virus software won't work in Windows 95 either. But thousands of old viruses will.

So that leaves you with a choice.

Do nothing and hope you never come across an infected floppy or download an infected file. Or buy a new anti-virus software product that

from the viruses everybody already knows about.

But also from the new viruses every day.

What's more, you get all this ironclad

# DETECTION, PREVENTION, DESTRUCTION. IF YOUR ANTI-VIRUS SOFTWARE DOESN'T HAVE ALL THREE, YOU'LL BE COMPLETELY EXPOSED TO VIRUSES IN WINDOWS 95.

can work in this new environment.

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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

**Quick Tip:** Check later in the chapter for techniques for changing the dull WAV files that ship with Windows into more interesting fare.

There are dozens of applications on your disk, and dozens of system events tied to them. Windows can sing to you every time you open an application, close one, minimize or maximize, make a mistake, or receive e-mail. Don't just sit there, Go hog-wild. Assign away—just remember that the more noise your system makes, the more distractine it will be.

Quick Tip: As you assign sounds to system events, select Save As and give your new sound scheme a new name. If you get really irritated by the racket, you can revert to the last event scheme instead of meticulously deleting sounds from the Events list box.

#### Whistle While You Work

There probably are studies showing that your productivity increases when you play music you like. Just as there probably are counterstudies that claim listening to music decreases productivity. Who cares? You can do it if you have a CD-ROM drive, and that's good enough.

Every CD-RÖM player made over the past six years plays audio CDs. All you need is a program to kick it into gear. Guess what? Windows 95 has one. And better yet, to play a CD, all you need to do is pop it into the CD-ROM drive.

Inte Sgt. Pepper's Lonely Hearts Club Band Sgt Pepper's Lonely With a little help from, A With a little help from ∆ Lucy in the Sky with ∆ Getting better Lucy in the Sky with. ☐ Getting bette
☐ Fixing a hole A She's leaving frome Being for the benefit A She's leaving hor A Being for the benefit Within you without y.
 When I'm 64-bit. △ Lovely Rike d Lovely Rita ran . It Sgt. Pepper's Lonely Hearts Club Band Set Name Lancel

Turn It Off! Take that one CD track you don't like, and get it off your playlist permanently with a simple click of the Remove button.

#### WINDOWS FIXER

THE MEDIA PEOPLE PLAY

How many things can Media Player play? Odds are it's more than shows up in the Media Player Devices menu. To see the full quota, check the Control Panel's Multimedia Properties dialog box, and click on the Advanced tab. Under the Media Control Folder, you'll see a number of devices you didn't think your PC could handle. It's quite an education to learn that you can control VISCA VCRs through your serial port using Windows Media Player. If you want to disable any currently enabled medium (Video for Windows, for example), just select it, and click on the Disable button. Next time you check for it in the Media Player Device menu, ta-dal tiss it there.

Quick Tip: Want to pop an audio CD into your CD-ROM drive and not have it start playing right away? Hold down the Shift key as you insert the CD. This prevents Windows from starting the CD player.

So if it's that simple, why write about it? Because there's more to a CD player than just playing a CD, that's why. You can enter a list of the tracks on a CD and Windows will remember them next time you insert the disc. Or you can change the running order of tracks. Or tell it to skip tracks you don't like, or skip the data track of a CD-ROM with audio CD tracks. So read on.

Quick Tip: To play the audio CD tracks from a regular CD-ROM (which uses the first track for CD-ROM data), you have to find CD Player

manually. It's in the Start menu's Programs, Accessories, Multimedia menuor select Start, Run, and type CDPLAYER.

#### Be Your Own DJ

Every CD has one—the track you can't stand. When it comes on, you always reach straight for the advance button. But it's just not productive to stop working every time that happens. Better to expend some effort up front and build your own playlist. It's easy enough. And best of all, you do it only once, and whenever you insert the CD,

Windows checks the CD against a list in CD Player's INI file and follows your playlist to the letter.

To build a playlist, first put a CD in the drive and wait for Windows to load CD Player. From the CD Player screen, select Disc, Edit Play List. Enter the name of the artist and the title in the appropriate boxes.

In the Track box, enter the name of the first track, press Enter, and continue entering track names until you've reached the end. To remove a single track from the playlist, select its name in the left pane and click on the Remove button. To change the running order of the tracks, click on Clear All, and select the first track you want to hear in the right pane. Click on Add. Then repeat this process for all the tracks, listing them in the order you want them played. Click on OK to save your playlist.

Quick Tip: Right-click on the CD-ROM drive icon (or its shortcut on the Desktop) and select Eject to either eiect the CD or send it back in.

#### A Meatier Player

OK, so now you can operate software that emulates a stereo system. And you get to hear some tunes as a result. This is nothing. You can do the same in Media Player—plus a whole lot more—and impress people at cockrail parties with your technical prowess. (The cockrail parties with MPCs playing the tunes, that is, It could happen.)

We know what you're thinking: Media Player, an application only a mother could love. Smart, yes. Able, yes. Versatile, yes. Cussed and ugly, emphatically yes. But it's still worth knowing—if only Continued on page 244

SEPTEMBER 1995

ongratulations! You're the proud owner of Microsoft's Windows 95 operating system. Working on a PC has never been easier.

Now try these ten easy exercises and see how you can work even better and faster in Windows 95 with the all-new Norton Navigator.\*\*

| First, copy a file from one directory of the directory of the collection of

CK. file with Norton Navigator.

5 Try a word search for "profiss" or any other text string within files. It's at least ten times faster on average with Norton Navigator. No matter how many files you have. Or how big they are. In fact, the bigger the files, the more time you'll save.

Save another minute every time you delete, move, zip, or encrypt from



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Windows 95
supports long
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Opening a folder in Windows 95

2 Opening a folder takes a full five clicks of your trusty mouse. But with Norton Navigator, you can open any folder with just one simple click.

Complete Com

3. PK-Zip compatible compression saves you a minute every time.

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any application's Open or Save dialog box. (Are you keeping count?)

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#### NORTON NAVIGATOR FOR WINDOWS 95

NORTON NAVIGATOR
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Norson FastFind performs specific text string searches at least ten times faster than Windows 95.



for most 16-bit applications, too. So you'll never again have to remember what "billgbox" means.

## MAKE WINDOWS 95 AN EVEN

Well, there you have it. Our Top Ten. But try Nornon Navigator for yourself and we're sure you'll find your own favorites. Because one of the greatest things about Norton Navigator is it lets you work the way you want to work. Needless to say, it comes with our standard 60-day money-back guarantee. So get your trade-up

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# Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

Continued from page 240

because it's Windows' way of playing all manner of multimedia elements. By default, on a multimedia PC it plays waveform sounds, MIDI sounds, AVI movies, animations in FLG or FLI formats, and yes,

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Play It for Me One More Time: Pick a medium, any medium, and the Media Player can play it. All you need is the requisite Windows 95 driver.

audio CD titles. Run a few CD-ROM titles and install some heavy-dury video cards and you'll soon see that freshly-installed drivers have pumped up the media list to include QuickTime for Windows MOV files, and maybe exotica like CDI/VideoCDs, MPEG movies, and more. But we'll continue this later.

CD? That's Complex Disc, Right?

Fire up Media Player. The quickest way is to select Start, Run, and enter the word MPLAYER. There it stands, resplendent. But there's no music. So slip an audio CD into your CD-ROM drive, then from Media Player's Device



The Real Scoop: Control Panel's Multimedia Properties option shows the full scope of Windows 95 media.

menu, select CD Audio.

The picture changes a little. The window that forms the main section of Media Player has now acquired a scale that shows you the duration of the media—

the duration of the media for example, in the case of "Sgt. Pepper's Lonely Hearts Club Band," which

Hearts Club Band," which lasts 39 minutes and 52 seconds (if you include the whistle and the babbling tape loop at the end), the scale is broken into 10-minute increments.

To start playing the opening track, you obviously click the forward-arrow button. The forward- and backward-arrow keys underlined with vertical bars (Last Mark

and Next Mark) jump to the next or previous increment on the scale. A click on the double arrows rewinds or fast-forwards 2 minutes and 29 seconds in either direction. And the up-arrow button eiects the CD.

But stop! Who ever heard of a CD player that measured in time and not track numbers? The only advantage (and it's a very real one) is that if you want to bootleg an audio CD—err, that is, make an archival backup tape (yeah, yeah, that's the ticket, Mr. Copyright Control Man)—you can see at a glance whether it will fit on one side of a cassette tane.

Since we're obviously not going to encourage the breaking of international copyright law, let's change Media Player's scale to something a little more CD-player-like. Under the track memu, select Scale, Tracks. That'll do it. Now every time you select CD Audio, it will display the tracks on the scale by default. But CD Audio is only one of the media that Media Player can handle.

#### Lights! Camera! Roll 'Em!

Let's face it—sometimes you'd rather just watch TV. But this, of course, wouldn't be computing, so you'd feel guilty about it, which would be a bad thing. So when Microsoft invented

Video for Windows and released it as an add-on to Windows 3.1 in 1991, it made it worse than television. The reasons are actually more technical than sociological, but Video for Windows on anything less than an incredible (and incredibly expensive) PC falls for below broadcast television standards. This is true also of the animation standards from Autodesk—namely, FLC and FLI files—that Media Player also handles. Video for Windows' AU files, on the other hand, are more complicated.

#### Audio-Visual Interleave: A Mouthful, Not a Screenful

Windows video files contain both sound and picture elements—no surprises there. And these elements are arranged in an interleaved fashion, hence the



Show Me: Instead of guessing when you adjust the size of a video clip, Media Player offers a previewer—right down to the blocky pixelation.

Video for Windows file format's name: audio-video interleaved or AVI. And like any Windows media type, you can play AVI files from the Media Player. But before you do, prepare yourself. AVI files aren't exactly disappointing, but they're not Lawrence of Arabia either. They aren't even Remasco (Cinemascope as shown on TV, with the right and left extremes cut off).

In fact, AVI files are usually somewhere between 240 by 180 and 320 by 240 pixels in size (between a third and half the screen size of a regular VGA monitor). To see just how small this looks on screen, run Media Player, select Video for Windows from the Device

Continued on page 248 SEPTEMBER 1995



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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

Continued from page 244

menu, and from File, Open, go to the Media folder and pick an AVI movie.

To play it, click on the Play button (obviously). To fast-forward, use the appropriate (and obvious) control. To zip to a particular frame, drag the slider on the scale and drop it wherever you want. This isn't too difficult.

However, there are some weightier issues involved with Video for Windows. If you're content watching animated baseball-card-size windows, skip to the sound-playing sections later in the chapter. Otherwise, prepare for some cocktail-party trivia and handy hints for PC-based video playback.



All You Need to Know: Right-click on any multimedia file's icon and check for details such as codecs.

#### Why So Small?

When you watch a movie on television, it's in analog format, and appears at approximately \$12 pixels wide by \$480 lines deep, and with a color depth of 24 bits (or 16.7 million colors). The movement of the moving pictures is simulated by replacing each image with one slightly different image (the same principle used in animation or flip books). On TV, the frames are changed 24 times a second. The rate of change—called frame rate—is even faster in movie theaters, where 30 frames per second is the norm.

Here's the rub; If Video for Windows were to attempt frame rates, image sizes, and color depths like those used for movies, it would be pushing through your system 28MB of uncompressed data. A minute-long clip could fill your hard disk to capacity and would definitely choke up your entire system—from hard-disk controller to CPU to video-accelerator board. No PC could keep up with data rates like that.

So Video for Windows is an exercise in compromises. It uses compression algorithms called codees to reduce file size, skimps on frame rates to to reduce file size, skimps on frame rates to an acceptable 15 frames per second, drops occasional frames to prevent the system from overloading and breaking the continuity of the sound track, and reduces the window size to reduce the number of pixels it needs to transfer.

Some of these things can be controlled from the Media Player—although the choice of codec and frame rate are the preserve of whoever created the AVI file.

AVI files come in all shapes and sizes, all color depths, and all frame rates. To understand your AVI file, right-click on it in an Explorer window. You'll find a wealth of details about your media clip under the Details tab—some of which are really handy. If you ever examine an AVI file that was created with Adobe's Premiere—video-editing program that lets you slap together tilting, still graphics, and other clements into AVI files—you'll see that it's large and awkward in size, more like a photograph in its dimensions.

At first glance, you'd never know whether it would overload your system. The acid test is this: What transfer rate does this file demand? The answer is the Properties Details box. If the data rate is up there in the 500KB-per-second range, your hard disk will be able to keep up, but it will probably be too much for an average VGA system. Therefore, this clip will probably drop a lot of frames on playback (assuming the Skip frames if behind check box is checked).

Quick Tip: Want your video clip to rewind automatically and play again and again until you stop it? This option is available under the Media Player's Edit, Options menu. Press Ctri-O to bring up the box. Click on Auto Repeat.

## One Click Makes You Larger What if you have a tiny little picture,

What if you have a tiny little picture, and your frame rate is small, and your system is fast? Well, you can increase the size of your playback window. Simply get into the Device, Properties menu and click on Window, Double Original Size—or any of the other sizing options, including full screen. The size of the window will, predictably, increase. But it does so by increasing the size of each pixel in the frame, so the picture will become blockier. This makes larger windows a less-than-attractive option.

Quick Tip: Another way to change the video-playback options is through Control Panel's Multimedia, Video option.

#### And One Drag Makes You Small

If you have a large image that's intrusive (or that exceeds the screen's real estate),



Give It a Whirl: There's more than information in the Properties boxes of multimedia files—there's sound

reduce its size in the way you'd expect—drag one of the corners inward with your mouse. This technique won't make the playback any smoother, but it does ensure that it stays within its boundaries onscreen.

Quick Tip: Want to know the codec used in a particular video clip? Or the color depth, playback rate, or number of frames? Right-click on its Explorer icon to bring up a Properties box, and click on Details.



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#### STEP BY STEP

RESIZING AVI WINDOWS IN MEDIA PLAYER

No Manual Resizing: A window is a window is a window—right? Maybe to Gertrude Stein, but to the rest of us, there are subtle differences. How do you resize a normal window? Several ways. To maximize a window, you click on the square Maximize button or double-click on the title bar. To resize a window, drag on its bottom-right corner. But you shouldn't do it with an AVI file in Media Player. Maximizing doesn't work right, and uneven resizing looks just awful when it plays back at 15 frames per second or more. Not a pretty picture. Instead, a view the following technique a try:



1. Roll! When you open a Media Player file, its window size usually depends on the movie's frame size—and that's usually 320 by 180 pixels.



2. Stretch: Sure, you can drag the corner to resize an AVI file, but the best results come from selecting the Device, Properties menu.



Properties box shows a picture of the window size relative to the size of your monitor but it's only a proxy, not a real preview.

3. Preview: The Video



4. Assess: The one concession the window-size picture makes to realism is to display full-screen images that look blocky and ugly—because that's how they will look if you click Apply.



5. Select: For best results, try Double Original Size—but even that choice might look less than acceptable in real life. In that case, experiment with the other choices from the Window drop-down list.



**6. Ahhh...** The only way you can tell how the movie will look is to click on OK in the Properties box and click on the Play button in Media Player.



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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

Continued from page 250

So much for pretty pictures. Media Player handles all sorts of media. We've already covered its attempts at being a home-music appliance. Now it's time to move to other digital sound.

#### A Codec Moment

We briefly touched on codecs—the compression and decompression algorithms used by Video for Windows to reduce the size of AVI files to allow for smaller storage space and smoother playback. The big question is this: Let's say someone has a cool morph effect of all the presidents of the United States turning into each other, You want it. She wants to give it to you. She says, "You can play back Indeo 3.2 files, can't you?" Don't panic. Don't say no. Don't nod dumbly. Check to see which codecs are installed on your system. They're right there under the Control Panel's Multimedia icon. Click on the Advance tab's Video Compression Codecs folder. Who knows what you'll find there (codecs can be plugged into Windows at a moment's notice by new software installations), but you'll find the answer, (Yes, you can play Indeo 3.2-compressed files with Windows-so you can watch those presidents on your PC soon.)

#### Sound Advice from the Media

You've heard WAV files already—every time you start Windows, every time you make a mistake, and every time you quit. Another type of sound file available to you is MID (for MIDI).

What's the difference between WAV and MID? MIDI is a musical format only, so you can't record your voice in MIDI format. But the differences go deeper than that. MIDI files contain instructions for

ØE. 19231 Bach's Chmes 5th Symphony epilla quite rgalle. Chord Dance of the Debussy's Hall of the Mountain King 1 (F) ingle Astersk Jungle Close Jungle Entical Jungle Default Jungle Error

Name That Tune: Except for a few sound holdovers, the contents of the Media directory have long filenames that describe the contents.

playing the sounds themselves, rather than recordings of the sounds. They're like sheet music-they require someone or something to read them (in this case, Windows and Media Player) and something to play the notes on (in this case, a synthesizer chip on the sound card in your PC). Both MIDI and WAV files can play the same tunes, but they may sound different depending on the number and quality of the MIDI instruments or voices your sound card can produce. And most important, MIDI files are a fraction of the size of WAV files.

#### Play That Thang

Ther's nothing to playing WAV or MIDI files with Media Player. Simply select the appropriate media type from the Device menu, and use the obvious controls play, fast-forward, jump, pause, and stop. The only important configuration elements for playback of both file formats are under Edit, Options: If you want to rewind the sound, check the Auto Revind box. If you want to drive yourself insane by hearing an endless sound loop, check Auto Repeat. CITRUS US you don't want to do this.)

#### The Sound Recorder: Reduce, Replay, Recycle

Using Media Player only to listen to and compare WAV sounds is overkill. Just as most of the cosmos plays audio CDs using the a CD-ROM drive, most people will play WAV files using Sound

Recorder. Why? Because it's easy and because you can edit files.

Quick Tip: To hear a quick preview of a WAV file, right-click on its icon in an Explorer window and select Play.

There's plenty you can do with Sound Recorder and WAV files on your hard disk. Use the File Open menu's dialog box to locate and load a WAV file. Now

Description of the Commission of the Commission

Shrink the Sound: Using the 32-bit Sound Recorder, you can resample disk-hogging 44Hz, 16-bit stereo WAV files with a firstful of codecs

click on the Play button. You'll hear the WAV file play. Big whoop. The way sounds look is more interesting—especially if you used to watch oscilloscopes in old science-fiction shows as a kid. Sound Recorder has the same blips on its green line as the ones you see on oscilloscopes.

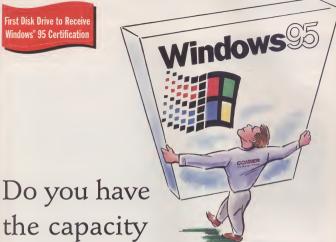
Take a look at the waveform pattern that makes up the sound you've just heard. Click on the Rewind button at the lower left of Sound Recorder. The Position status be will show 0.0 seconds and the scroll bar's slider will be located underneath it. Slowly drag the slider to the right and watch the green line in the wave-form window. If any pattern of blips grabs your interest, stop dragging and click on the Play button to hear what that pattern erervesents.

#### Small Is Beautiful

WAV files can be big, very big, And cutting off the dead space using the slider bar and Edit menu's Delete Before (or After) Current Position won't help much. What you need to reduce the size of sound files is a good codec. Like Video for Windows, WAV sounds are compressed using various techniques—six, to be exact: ADPCM, CCITI A-law, CCITI U-law, GSM, PCM, and TrueSpeech.

Quick Tip: Want to know the codec used to compress a particular sound file? Right-click on the file in an Explorer window, select Properties, and click on the Details tab. Alternatively, select File. Properties in Sound Recorder.

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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

#### STEP BY STEP

TRY SOUND FILES ON FOR SIZE

Low-Cal Diet for Your WAV Files: Multimedia files are usually so large, one might say they've been designed to boost hard drive sales. But that neat startup sound could be trimmed down by 50 percent without noticeably degrading its quality. Sound Recorder supports seven different sound-compression techniques. You can set different frequency, bit depth, and sound channels (stereo or mono) for six of these techniques (not for TrueSpeech) to reduce the file size. Here's a tip: Try mono, sub-22kHz, 8-bit sound on for size in your WAV files.



1. Examine: After opening a WAV file, select File, Properties, and make a note of the Length, Data Size, and Audio Format details. Under Audio Format, look for something to reduce.



 Evaluate: Click on the Properties box's Convert No button, and you get a reiteration of the Audio Format details—plus the data rate in kilobytes per second.



3. Improve: If you're not exchanging WAV files with Windows 3.1 users, try a Format other than PCM. ADPCM sounds good at lower sampling rates. (TrueSpeech is tiny, but it works with speech only.)



4. Reduce: Under Attributes, check for smaller data rates. But you really shouldn't dip much below 11kHz, 4-bit mono if your WAV is a music file (unless, of course, your speakers are so bad that sound quality isn't important to you).



Case: Now you can name your format although you won't know what your mix-andmatch sound sampling will sound like yet.

5. Just in



6. Test-Drive: Once you've clicked on OK to convert the sound, always play back the results before you save. If you're not satisfied with the sound, select File, Revert to the saved file, and start all over again.

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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

Converting

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To:
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Cancel

But Does It Sound OK? Don't save the sound file you've just sampled at a lower frequency until you're sure it sounds acceptable. But in general, try out ADPCM. It's smaller and just as good as Windows 3.1's PCM.

For the sake of your hard disk, it's always best to keep sound files as small as you can get them. Here's a technique to reduce the size of sound files: Open the WAV file in Sound Recorder and play it to gauge how it sounds. Select File, Properties and click on Convert Now. Note the contents of the Attributes box, especially the file-size-per-second at the far right. In the Name box, reduce the level of sound-if it's CD quality, go for radio quality. If it's radio quality, then go for phone quality. If you know the codec format and attributes you're aiming for, make your selection from those boxes instead of the Name box, Click on OK, and preview the sound.

Quick Tip: If you don't like the sound of a resampled WAV file, select File, Revert. A dialog box will ask if it's OK to go on. Click on Yes. The file will revert to the last version you saved.

A Little Sound Goes a Long Way Want to keep the hard-disk footprint of your WAV sounds way down? Keep these factors in mind:

 Stereo sound doubles the size of a file. Would moon sound do just as well?
 What sampling rate can you handle?
 While H.1kHz is supposed to be CD-audio quality (though it's rarely that good), 22kHz sound isn't so bad. And ItlHz is OK, too—fa little more like a phone than a radio. For voice, 8kHz or lower is lust fine—and much smaller.

- Can you spare 16 bits? Although 16bit sound is supposedly adequate, for a system event, almost nobody objects to 8-bit sounds.
- Pick the right codec. Windows' default sound codec is PCM—a little on the disk-hogging side, but clean-sounding. ADPCM WAV files often sound as good, and are smaller. For voice, TrueSpeech is the best choice—at a tiny 1KBps of speech—if you don't mind sounding like you're calling from a pay phone.

#### The Wall of Sound

Between December 1966 and April 1967, George Martin, Geoff Emerick, six sound engineers-oh, and the Beatlesproduced the less-than 40 minutes of music that make up the Sgt. Pepper album, Martin and Emerick estimated the time spent on the project part-way through. They accounted for 700 hours on the project-and it wasn't even finished. Ever wish you could indulge yourself half as much? No problem. Microsoft throws its own special-effects pedals into Sound Recorder so you can fabricate bizarre auditory overload from the most mundane sound files. We can't promise it will change the way people listen to rock albums forever, but it will change the way you listen to Windows for a week or two. And that's just as good. You just need a few WAV files and too much time on your hands.

Most of Sound Recorder's special effects are available under the Effects menu, but you can get some mileage from the Edit menu as well. To see Justem how far we've regressed (it was 28 years ago today), open up one of the more mundane sound files in your Windows directory—DING.WAV. There it will stand, 0.5 seconds of digital sound, ready to be turned into a wall of sound.

One, Two, One, Two, Three, Four Sound Recorder's Edit, Insert File menu makes it possible to insert a second sound file-or even several of them-into the current one, Because Sound Recorder loads its sound files into memory and doesn't look back at them, you can load multiple iterations of the same sound file at once Use this command to load DING.WAV twice into the current iteration of DING WAY. You'll now have three dings in one file. Don't play the sound yet: for one thing, the indicator needs to be right where it is now (two-thirds of the file's length from the left) so you'll be ready for the next step. But more important, hearing three high-pitched dings in quick succession is bad for the nerves.

#### All in the Mix

In the Edit menu, Mix With File lets you blend the sound of a file on disk with the one loaded in Sound Recorder. The sound files will play simultaneously. The first step is to cue up the sound file in memory. (Unless you gave in to temptation at the end of the last section, this will already be in place.)

From the Édit menu, choose Mix With File, and select DING.WAV. Click on OK. Now play the sound file. You'll hear a single tone. Play it again, and you'll start from the beginning—you'll hear three tones. The last one will be louder, since it's actually two dings playing together.

#### Say It Slowly

Did you ever get a charge from playing singles at 33 rpm, or LPs at 45 rpm<sup>2</sup> (In the Viryl Era, sometime after the Creacous Period.) Try the same effect on your WAY files with Effects, Increase Speed (by 100 percent) or Effects, Decrease Speed. In the case of the three dings, faster is nerve-shatteringly liands (Slow the sound, and it lowers the pitch and doubles the playing time—which for DING.WAW is an unequivocal benefit.

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## Windows 95 MAKING IT WORK FOR YOU Sight and Sound: Multimedia

Don't like it? Return the sound to its previous speed. Choose the Increase Speed command right away. To increase the speed of a sound, choose Effects, Increase Speed. Think this sounds worse? Undo your changes by immediately choosing Decrease Speed.

#### Is There an Echo in Here?

A little trick some bands have used to enhance vocal tracks is to slap on a little Echo, It creates a fuller sound—which is handy if the voice in question isn't very strong. Want to re-create that effect? Select Effects, Add Echo. This bounces DING's bell tone back, not unlike the sound of little chapels in the Welsh hillsides calling pilgrims to worship. In other WAV files, you might not notice any effect from the Echo menu option-it tends to be most pronounced when used on short sounds, especially those that (in soundengineer parlance) have a sharp attack (meaning they start quickly) and a short decay (fade out quickly).

#### Paul Is Dead, Paul Is Dead

As long as you don't excessively use this effect around people who have frail concepts of reality, playing sounds backward can sometimes improve a sound effect. To reverse a WAV file's sound, select Effects, Reverse. Play the finished file to hear the monster you've created. If you like the result, save it under a new name (after all, DING.WAV can be useful source for more tinkering).

Too many effects spoil the sound file. But because File, Revert takes you to the last saved version, you should keep a record of your experiments by regularly saving files under new names. Use File, Save As during your sound mixing sessions, and save your working sounds in their own folder. When you get the PC equivalent of the Wall of Sound, navigate My Computer or use Find to get to your experiments, and delete all the trial versions you saved. You can even delete the file you currently have open, since Sound Recorder keeps the live file in memory, as long as you return to Sound Recorder and save the file again later.

#### OLE! OLE! It's Show Time!

There are good and justifiable reasons for taking your multimedia or sound clips and thrusting them into your humble spread-



**OLE Sound Clips:** Using the arrow buttons at the bottom center of the Media Player, select video clips or any other media to use as OLE objects.

sheet or text document. You figure out the reasons. Here's the technique In Media Player, select the clip you want to embed into another document. Select Edit, Options, and in the OLE Object box, select your preferences of how the object should appear. If you choose to use a caption, replace the unintuitive filename with something meaningful. Clike on OK to save your preferences, and then either press Chri-Cor select Edit, Copy Object to copy the media clip to the Clipboard. Press Alh-Tab to switch to the target OLE-container application (the one you want to play the media clip in). Select Edit, Paste

Special or Paste Object (the exact phrasing varies between applications). Follow the instructions about pasting the item into your document (again, these will vary), then click on OK. To play the clip, click on it.

That's the basic technique. But there are some nice wrinkles to the use of OLE that expand it. In fact, the possibilities, while not endless, are certainly very entertaining.

#### Play It Again, Sam

Bear in mind that anything Media Player can play can become an OLE object. Why not play your favorite song from your favorite CD you know, the one that never leaves your CD-ROM drive. It's mind-bogglingly easy to do, and the technique demonstrates a trick you can use for any other media type—how to mark a portion of a media clip to play automatically using OLE.

Here's how. First, load a CD into the CD-ROM drive. (By now, you know what our choice would be.) Select CD Audio. If you want to play a whole track from your OLE client application, click on the Next Mark button until you reach the start of the track. If you want to play just a portion, play the CD until you reach the right spot, then click on the Pause button. Click on the Pause button.

on the Fause button. Can some beart Selection button (the left of the two buttons between the main controls and the time box). Move the slider to the end of the clip you want to play either by the control of the clip you want to play either by Mark button, or simply dragging the slider. Click on the End Selection button. When the blue fill appears between the two marks, you know you're in business. Select Edit, Copy Object, then switch to your OLE client application and paste the object into the document using Paste Special. To play the clip, click on it twice in the OLE document. As they say in Hollywood, "That's enterainment's enterainment's enterainment's



**OLE What?** Once you've embedded an OLE object into an application that plays it, give it a label that'll make sense to the recipient.

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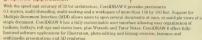
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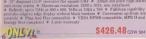
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Dot pitch	.28mm	.28mm	.28mm	.28mm	.28mm	.31mm	.28mm
Max. resolution (non-interlaced)	800 x 600	1024 x 768	1024 x 768	1280 x 1024	1280 x 1024	1280 x 1024	1600 x 1280
Refresh rate at 640 x 480	72Hz	72Hz	72Hz	72Hz	72Hz	72Hz	72Hz
Special features	Energy Star	Energy Star	Energy Star	Energy Star on-screen display digital controls	Energy Star on-screen display digital controls	Macintosh compatible	Mac compatible, color temp digital controls
CDW Price	\$237.56	\$249.34	\$319.29	\$375.84	\$664.57	\$1069.44	\$1599.79
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Quick, affordable entry-level laser printer
Specifically designed for Windows user, the KN-0100 receives its print commands directly from your
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document creation option. Ideal for 466 or Pentium' computer users.

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\*V 80mi-automatic duplicing \*V 60m-exerce interactive beloy \*Enhancement to printer made through user-installable
\*software \*V Paper handling 100 sheets letter, 30 sheets of labels, 30 transparencies, 10 envelopes \*V Size:
\*Strikt 971.13 \*\*
\*Strikt 971.



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Hardware requirements: PC-compatible 486SX, 4MB RAM (8MB or more recommended), 4MB hard disk space, parallel printer port
Software requirements: MS-DOS V3.3 or later, MS Windows® V3.1 or later, permanent sixtual memory (PC RAM plus sixtual memory must equal 12.5MB or more)

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# **Reach Out: Fax and Telephony**

Sorry, I'm on Windows 95 to someone. I'll call you as soon as I'm done. Or would you prefer me to send your Windows 95 a fax? No? OK, I'll have my Windows e-mail your Windows, and we'll be set. Congratulations. By installing Windows 95, you've turned your PC into a \$2,000 telephone. Oh, it's a fax machine,

too. And an e-mail box. It's also a terminal emulator and a front end to a graphical online service.

We know, You've heard all this before, and there's software aplenty that can do all this stuff under older versions of Windows. But under Windows 95, it all comes together under one roof. Once you've installed Windows 95 on your PC, all you need is a fax modem (14.4Kbps or faster is best) and the rest of this chapter to tell you what to do. So equipped, you'll be able to: use Windows 95's Phone Dialer applet as a smart Auto-Dial; use Windows 95's Exchange as a fax center; use Windows 95's HyperTerminal to dial up text-based servers or other people's PCs; and use sign-on software to dial up Microsoft Network (MSN to its friends), a subscription-based online service run by Microsoft.

You can, of course, do a whole lot more. With a Web browser like Netscape's Navigator or various commercial versions of Mosaic, and an account with a local service provider, you can use Windows 95's TCP/IP stack to get onto the World Wide Web.

With sign-on software from America Online, CompuServe, Prodigy, and others, you can get onto different graphical online services through Windows Telephony API (TAPI) services (a programming interface that runs interference between the Windows system and the phone lines).

Quick Tip: Give America Online, CompuServe, and Prodigy the same chance to run under Windows 95 as the bundled MSN software. Call the services for information about getting their sign-on software: America Online's voice number is (800) 827-6364; CompuServe's voice number is (800) 848-8199; and Prodigy's voice number is (800) 776-3449.

From within Windows 95 itself, you're pretty much stuck with phones, fax, e-mail, and MSN. And before you can use any of them, you need to make sure your modem works.

#### Modem, Meet Windows-Windows, Modem

You have a modem. You know you have one because you just plugged it in to be serial port at the back of your computer. But Windows doesn't know it yet. The Plug-and-Play system that enables Windows 95 to know (as if by magic) what hardware is attached or plugged in to your PC sometimes needs a mudge.

To introduce Windows to your modem and vice versa, take your favorite route to the Control Panel and click on the Modems icon. If you haven't already installed a modem, the first thing you'll see is the Install New Modem Wizard's first dialog box. If you're replacing an old modem that is already configured under Windows 95, remove the old one from the modem settings box and start the Control Panel's Modem routine again. Windows Wilkick up the Install New Modem Wizard, which will step you through the installation process.

There's not much to know about the Install New Modem Wizard. In almost every case, you click on the Next button and it does all the work. Certainly, it gives you the chance to identify the modem by yourself. But take our advice: Don't. In general, when Windows asks if you want to do something yourself or let Windows do the work, let Windows do the work it it messes up, it will know how it messed up. Your mistakes will be a mystery to as mystery as well as well as the sum of t

Quick Tip: What if the Install New Modem Wizard doesn't recognize your modem? Ignore the error message and install it manually. Use generic drivers for modems that operate at the same speed as yours.

#### WINDOWS FIXER

QUICK CHECK FOR MODEM PORT

When you install and set up a modern under Windows 95, it automatically detects the CDM (communications) or serial port to which the modern is attached. But if you install other communications software, such as WinCIM or America Online, it usually asks you to identify the port yourself. The quickest way to find the port in question is via the Control Panel's Moderns icon. Right-click on that icon, and when the Properties dialog box comes up, click on the Diagnostics tab. This will show you all the serial communications ports, and what 's attached to each. Often, there's a mouse on one of the ports, but it's possible to plug printers, scanners, or other peripherals in to them, too.

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## Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony



**Don't Even Think About It:** Like kids, Windows has to make its own mistakes. Let it search for your hardware. Intervene only if it comes up dry.

Or if you have a modem installation disk, click on the Have Disk icon and use the installation disk.

#### Set Up a Dialing Profile

When you have a PC that has a couple of serial ports, you're getting into some interesting configuration options. You could stick a modern on each, hooked up to different phone lines. Or you could put a data modern on one and a fax modern on the other. The possibilities aren't quite endless, but they're certainly numerous.

Until you've configured your ports, though, you have no options at all. Of course, it's something that you do automatically when you install Windows 95 for the first time, but here's how to create your dialing profile:



Don't Overautomate: It doesn't help to include the 1 you need before dialing a long-distance number.

Get into the Dialing Properties dialog box (from the Control Panel's Modems option). Your Where I Am details will already be in place from when you first installed Windows 95, and they won't need to be changed unless you move the PC to another area code. But if you use more than one modem, you can set them both up here. In the How I Dial from This Location section, enter all of the relevant details for getting an outside line, using a calling card, and disabling call waiting, Click on OK to

save your settings, and you're ready to make a call.

Quick Tip: If you need to enter 1 to make long-distance calls, don't

enter it in the Dialing Properties box. Most people automatically precede the phone number with 1 anyway. Don't retrain yourself to dial in a way you wouldn't use on any other phone—you'll only mess up more often.

#### Let Your Dialer Do the Walking

We can almost hear you saying, "My phone already has speed dial. What possible benefit can I get from a Win-

dows application that does the same thing?" We know what you mean, because we used to think the same way. But the Phone Dialer can do some things that you can't do with a phone, so it's worth getting to know. The main benefits are easy-to-edit speed dialing (no regular phone can boast that); no-key dialing using cut-and-passe on phone numbers; call logging (you get a time-dare stamp, the outgoing number called, and a log of incoming calls); and avigation of phone-mail trees using special modern commands (no more 26-key numbers)—Phone Dialer can overcome all of the phone-mail trees.

At its most basic, Phone Dialer is merely an extension of a telephone. You enter numbers either by mouse-clicking on them in the applet's pad or by entering them from your keyboard's numeric keypad (which is confusing because a keyboard's numeric keypad is an upsidedown version of a phone keypad).

#### Anatomy of a Phone Call

If you dial the same number frequently, you can store it on a speed-dial button by just clicking on an empty speed-dial button, filling in the details, and clicking on Save or Save And Dial.

Next time you click on the button, up pops a dialing box. While the modem is beeping out the number, you wait. As soon as it stops, you're free to pick up the phone and click on the Talk button. Once you've finished the call, you can click on the Hang Up button.

#### Caller's Log

The call log is a handy feature if you're billing clients for your calls. Check the Tools menu, Show Log option.



We All Have Hang-ups: Merely clicking on Hang Up doesn't hang up the phone—you headset wearers need to hang up the phone, too.

Here you can see the names of the people you called and their phone numbers, as well as the time, date, and duration of the call. If you made a long-distance phone call for four hours and you don't want anyone to see is, simply highlight it and press the Delete key. There. Now you can claim it's a billing mistake that was made by Sprint, MCI Communications, or whoever beat out the other providers for your long-distance dollars.

Quick Tip: Once you've picked up the phone, you can click on the Hang Up button and still remain connected. The only difference is that your call log will show the call as shorter than it actually was.

Continued on page 278 SEPTEMBER 1995

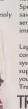


# LapLink Gets You There...And Back

The road to Windows\*95 promises to be exciting. But if you ever communicate with another PC you could run into a roadblock. There's nothing in Windows 9.5 that lets you communicate with Windows\*3.1 users. Fortunately, LapLink\* for Windows\*4 clears the way with your lifesaving link between Windows 3.1 and Windows 95 machines. Here's why LapLink is an essential tool for getting to Windows 95.

Remote Control Remote control gives you uncomplicated access to applications and data from home or portable PCs. You'll effortlessly connect to the office even if your PCs

are running different versions of Windows. LapLink for Windows supports your Help Desk staff by letting them look at exactly what other users are experiencing onscreen in real time, correct problems,



and even train users without being on site. This is the only tool that lets techs work with up to 15 systems in 15 different locations simultaneously over network, modem and cable.

File Transfer with SpeedSync<sup>m</sup> When you purchase LapLink for Windows, you get the simple, reliable file transfer functions Traveling Software products are famous for. LapLink efficiently moves everything or anything to your new Windows 95 PC. Then, when you update files, SpeedSync transfers only the changes for time savings of up to 80%! As always, high-quality serial and parallel cables are included for immediate connectivity.

When it comes to Windows connectivity, Laplink is your Win/Win solution. It supports any combination of Windows 3.1 and Windows 95 systems. Cruise to your nearest computer or office superstore today. Or call 1-800-487-4313 for your free "Tips and Tricks for Managing Your Transition to Windows 95".

## TRAVELING

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## Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

Continued from page 274

#### **GUIDED TOUR**

USING THE PHONE DIALER FOR VOICE CALLS

Let Your Keyboard Do the Dialing: Are your dialing fingers getting stubby and numb from overuse? We know the feeling. That's where Windows' Phone Dialer comes in. At its most basic, it simulates your phone's speed dialer, but it has a couple of advantages over a phone: It logs the time and duration of calls, and it can navigate voice-mail trees using the crosshatch (#) and asterisk (\*) keys. To deal with pauses in dialing, you can use modem command characters like the comma flor a two-second pause) and W (to wit for a tone).



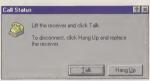
Remember: To add to or edit one of the eight speed-dial keys in Phone Dialer, select Edit, Speed Dial. (If you click on one of the speed-dial buttons instead, it dials out).



Short Name: There's a limit to the number of characters you can use to name a speed-dial button, but the phone number can go on indefinitely.



**Use It:** To dial out, just click on the speed-dial button. While it's dialing, you're presented with a chance to name this entry in your call log.



Switch to Voice: Once the number has been dialed, you get a Call Status dialog box. As soon as you hear the ringing tone, click on Talk so that the person you called doesn't end up talking through your modem.



Slam the Phone: When the call's over, click on Hang Up, and hang up the phone. Then you're free to check the Call Log entry, below.



Make Sense: The details in a call log are pretty sparse—which is why you should feel free to change the descriptor when dialing. To change the call type from outgoing to incoming, select Log, Options. The log entries are reusable—you can redial or edit any of the numbers. Click on any entry in the log, press Ctrl-C to copy it to the Clipboard, then Ctrl-V to paste it into the Dialer dialog box.

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#### Windows 95 Plug and-Play

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#### Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

Continued from page 278

#### WINDOWS FIXER

LONGER PHONE LISTS

If you run out of speed-dial buttons, why not make an additional list of long phone numbers that you don't dial quite so often and save them in a text file called NUMBERS.TXP? To open the list and the Phone Dialer at the same time, make a short batch file (use either Notepad or WordPad—but be sure to save the files as Text) like this:

NOTEPAD NUMBERS.TXT

Save the batch file, make a Desktop Shortcut to it, and whenever you click on the shortcut, the phone list and Phone Dialer will start up at once. Or if you want to do it by the book, look at using Exchange's address book in the "Telephone Exchange" section (below).

SHIL..

Mother-in-law moved away and has a new number? If you need to edit a speeddial button, select Edit, Speed Dial, elick on the button you want to edit, and change the contents of the two boxes Name and Number to Dial.

Cut Voice-mail Trees Down to Size If you'd like to speak to a customer-service operator, please press 1. If you'd like technical support, please press 2. If you would like a directory of people who work here,

like a directory of people who work here, please press 3. If . . . BEEP! If your party works in customer service, please press 1. If your party works in technical support, please press 2. If . . . BEEP!

Please spell out your party's name

using the keys on the keyboard . . .

Hey, if this sounds all too familiar, just bypass the whole thing. If you've gone through one of these trees once, you know the score. If you've ever used a credit card to dial a number, you know a much worse score—one that runs like this: Dial 11 numbers to reach the exchange. When there's a tone, press the asterisk (9) key—be quick, though, it has to be pressed during the tone!—then enter another 11-digit number. There will be another tone, and only after it's finished, press the crosshatch (#) key and enter a 16-digit code.

Oh, and if you misdial after the first 30 keystrokes, you have to start again. Whew. The Windows 95 Phone

Dialer can handle this without a second thought. Using the number keys, crosshatch and asterisk, and a couple of other code keys on your keyboard, you can store these long numbers forever in your speed-dial directory, and never face another muttered-cuss, marathon dialing session again.

There are three modem-command keys from the Hayescompatible command set that you need to know in order to navigate voice-mail mazes: The comma (2) pauses dialing for two seconds; its typically used after the 1 when accessing switchboards. W pauses dialing until the modem hears at one. The & sign pauses dialing until the modem bears alternee on the line.

Let's say you use a credit card for long-distance dialing. The toll-free exchange number is (800) 555-5555. When you dial, you must enter the credit card number while a tone is sounding. The credit card number is 1234-1234-1234-1234. After you enter the number, there's another tone, following which you enter the phone number you're calling. Then there's another tone, after which you press # and enter a four-digit code (say, 1234). Complicated. But here's how you'd enter the number in a single string (spaces and hyphens are optional for readability, but unnecessary):

(800) 555-5555 W 1234 1234 1234 1234 @ 555-1212 @ #1234

It's a long string of characters, but it will fit in the Phone Dialer box, and it works as a speed-dial button.



Voice-mail Velocity: In Phone Dialer, you can bypass long voicemail directories with the \* or # key.

#### Telephone Exchange

One of the most significant pieces of software engineering in Windows 95 is Microsoft Exchange. Exchange is the closest thing you can get to a single point of retrieval for all of your incoming information: local network e-mail, faxes, and e-mail from online services and the Internet, too.

What does this have to do with telephones? Well, Exchange is a deep product. Like anything that deals with e-mail effectively, it handles address books. And

Continued on page 286

#### WINDOWS FIXER

If a squealing modern disturbs you (or your family or neighbors), shut it up altogether each time you run this connection. (Remember, that's HyperTerminal-speak for using this configuration to dial.) Before dialing from the Connect box, click on the Modify button next to the phone number. Click on the Configure button in the next dialog box, then use the slider to move the speaker volume to Off. Bingo. No more whining hardware on your phone line.

Note: The modem is muted only for the number you have selected at the time—you have to repeat this procedure for new phone numbers.



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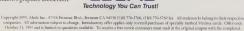
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#### WINDOWS 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

Continued from page 282

in each address book is space for seven phone numbers. And next to each phone number is a little button labeled Dial.

To access your address books, click on the Inbox icon on your desktop and select Tools, Address Book. This opens a file called MAILBOX.PAB (the extension stands for Personal Address Book) in the Exchange folder.

Quick Tip: As an alternative, you can press Ctrl-Shift-B to launch the Address Book.

There's not much to see in an address book until you've entered a name or two, so follow these steps to add your contact names:

Select File, New Entry. Select an Entry Type based on the usual type of contact you have with the recipient (Microsoft Network mail, fax, or other email type). Because Exchange's primary function isn't phone contact, you must first enter an e-mail or fax coversheet name and address. Click on the Phone Numbers tab, and enter as many phone numbers an encessary.

#### That's a Fax, Jack!

So your PC is now a fax machine. What does that really mean? For one thing, it means that you don't have to destroy the planet with shiny reels of nonrecy-clable paper and toner anymore. It also means that you have to keep your phone lines free at all times when you're waiting for that crucial fax. If you have a fax modem, you should have Windows 95's Fax component installed.

Quick Tip: To see whether or not Fax is installed on a Windows 95 system, right-click on any object on the desktop or in Explorer. Check the Send Tomenu. If Fax Recipient isn't one of the choices, you need to install the Fax component.

Like any part of Windows 95, if it ain't there, go to Control Panel, Add/Remove Programs to install it. Click on the Windows Setup tab, and scroll down to Microsoft Pax. Click on the check

mark, click on OK, and wave good-bye to 2.1MB of disk space. But wave hello to PC-based faxing, and prepare to become better acquainted with one of Windows 95's crowning achievements, Microsoft Exchange.

Quick Tip: If you receive a lot of faxes, get two phone lines with a modem on each. Hang one off each COM port, and configure one port as your fax device.

#### Fair Exchange

The Exchange Inbox is where you'll find all your incoming faxes, and where you'll start to compose many of your outgoing ones, too. Later in this chapter, as well as in the networking chapter, you'll find more information about

I'm Not at My Desk Right Now: If the person you're calling could be at any of several numbers, set those up in Exchange's personal address book.

what Exchange can do. But for the moment, we'll be looking at the fax portion of Exchange.

#### Get a Fax

Once you've set up the Microsoft Fax software, all you need to do to receive faxes is stay off the phone and elick on the Inbox icon to get Exchange running. Look in the tray at the bottom right of your screen (in the toolbar), and there's the fax machine icon. To receive faxes, follow these simple steps:

Left-click on the fax machine icon in the tray. If the phone's ringing with an incoming fax, click on the Answer Now button in the Microsoft Fax status window. If not, click on the single menu option (Options) and select Modern Properties. Unless you want to move quickly when the phone rings with a fax, select Answer After and select two rings. Click on OK and keep the Inbox open for those incoming faxes.

#### Read Incoming Faxes

Your phone line's free. The fax has been delivered. Now check the Inbox. You'll see a sholdface item in it with the little fax icon next to it. Don't just look there. Double-click on it to see who the fax is from. Sometimes, it has obviously been deliverus, in the pusical-down. If in has, click twice on either of the rotate buttons at the far-right side of the toolbat, and you're right-side, up again.

To move between pages of a multipage fax, click on the next icon in from the right to get thumbnail views of all

#### WINDOWS FIXER

ONE PHONE LINE, MANY USES

Most people don't spring for extra phone lines just because they hold conversations, send data, and exchange faxes—not right away, at least. If you stick with one phone line, people will have to call ahead before they can send faxes. When you're prepared to receive, follow the instructions under "Get a Fax" (above).

Note: Turn down the speaker volume in the Fax Modem Properties box, and make sure Turn Off When Connected is checked off.

But don't turn the speaker volume off completely. Why? Because if you hear a voice saying "Hello?" from your modem, you can rescue your callers before they get squealed at. If you hear a voice, pick up the phone right away. This will cut off the modem and transfer control to the telephone. Then click on the Hang Up button to stop your modem from squealing.

## Windows95? WindowsNT? Windows?



a FAX server and a MODEM server for all three.





#### Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

#### WINDOWS FIXER

GET A BETTER FAX THAN FAX

Everyone does fax. What's so great about Microsoft Fax? Here are some features that beat out the fax machine:

- You can simultaneously send the same message to different recipients via fax and e-mail. (See the section "Maintaining Address Books" at right.)
- You can send attachments—from editable documents to programs to other Microsoft Fax users. Right-click on any icon except a shortcut, select Send To, Fax recipient.
- You can password-protect a fax, even by means of robust security techniques such as public/private key encryption. In the Fax Wizard, select Options, Security.
- You can send editable text faxes to other Windows 95 PCs. In the Fax Wizard, select Options, Message Format, Editable, if possible.
- When faxing noneditable text from Windows to Windows, the compression is much smaller than standard Group 3 fax—hence the transmission time is shorter. In the Fax Wizard, select Options, Message Format, Not Editable.

the pages of the fax in an Explorer-like window pane next to the view of the fax. To zoom in on the fax, just select a magnification you can read from the drop-down box.

Quick Tip: Don't fuss with scroll bars to read a fax that's too big to fit in the Fax Viewer window. Once you've zoomed to a level you can read, just move your mouse into the viewing window. The pointer will turn into a hand, which you can use to drag the page around at will.

If you're a traditionalist, you may want to print a fax. If so, the option is there—just click on the printer toolbar icon or select File, Print. But if you're a

Fax and Figures: Windows 95's convenient Fax Wizard steps you through the fax process a must-have for the office faxophobe.

real Windows 95 type of person, you'll be more inclined to take portions of it to incorporate into another document, or send it via e-mail. This, too, is easy.

To copy a fax to the Clipboard, select Edit, Copy Page.

To copy a portion of a fax to the Clipboard, choose the square selection button from the toolbar and draw a box around a portion of the fax. From the Edit menu, select Copy. Press Ali-Tab until you've switched to the application and document into which you want to copy the fax. Press Ctrl-V or select Edit, Paste, and there it will be.

#### Send a Fax

So, you've just received a fax. You not only have the right and social duty to

reply to it, but you also have the means. In fact, under Windows 95 you have four ways of sending faxes—all of which use a special Fax Wizard.

From Exchange, select Compose, New Fax. From the desktop or Explorer, right-click and select Send To, Fax Recipiemt. In any application that supports printing, select File, Print, and change the printer to Microsoft Fax. From applications that support fax, open a document to fax, and select File, Send then select Exchange's Compose, New Fax. At its most basic, sending a fax using the Fax Wizard involves just a handful of steps. You verify the location you're calling from, insert the target fax number and the name of the recipient, choose whether or not to include a cover sheet, and give the thing a title and an introductory blurb. After that, it's ready to send. Naturally, there are a few added wrinkles that let you customize the faxes you send.

#### Maintaining Address Books

Almost nobody sends a single fax to a destination and never uses that fax number again. So to be more efficient in sending faxes, it pays to maintain an address book.

Microsoft Fax uses Exchange's address books—the same ones we looked at earlier for storing phone num-



Unlimited Fax Numbers: Enter names into your personal address book and use them in the Fax Wizard.

bers and automatically dialing them at a single button-push. Click on the Inbox icon on the desktop, then select Tools, Address Book. Use any of the three means to get into the Fax Wizard, and on the addressing step, click on the Address Book button, and select New.

Quick Tip: The best way to start up an Exchange address book for faxes (or phone numbers) is to get into the Address Book application through the Inbox icon. To update a list, add a number to it each time you send a fax.

There's not much to see in an address book until you've entered a name or two, so follow these steps to add your Continued on page 294

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#### Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

Continued from page 288

contacts: Select File, New Entry. Under Entry Type, select Fax. In the new Properties window, enter a fax cover sheet name, and the fax number. If you want, click on the Business, Phone Numbers, and Notes tabs and add other relevant details. Click on OK.

Those are the basics. Now you can go through your Rolodex and repeat these steps for every card in it. We'll see you in a few months.

Quick Tip: Does a friend have a new address or did she change her fax number? Get into your Address Book, right-click on the name, and select Properties. Make the changes and click on OK. Fallen out with someone? Right-click on the name and select Delete.

#### Junk-Fax Made Simple

No, we don't condone sending out the same fax indiscriminately—it's happened too often to us. But sometimes you have a message to send out to a select group of people—and that's what personal distribution lists are for. Once you've entered all the members of your fax circle into your Address Book, it's time to group them—you know, the list of Christmas Fax Recipients, Monthly Update, Begging for Rent Money, and so on. Here's how.

In the Address Book, select File, New Entry (or click on New). Under Entry Type, select Personal Distribution List.

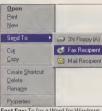
Name the group something you'll remember later, and click on the Add/Remove Members button. Double-click on names you want to include. If you add a name by accident, click on it in the right-hard pane and press Delete to remove it. When you're finished, click on CK. If you want to make notes in the group's Properties dialog box, such as the date of the last fax you sent to this group, click on the Notes tab and make them. When you click on OK to accept changes in the group's Properties dialog box, you'll see a new entry in the Address Book.

Quick Tip: A good time to make a personal distribution list is while you're sending a fax—this gives you a chance to make a note of what you're sending as you send it.

#### When to Send

Don't send faxes right away if they don't absolutely, positively, need to be there now. Save yourself a few nickels on longdistance faxes by sending them during offpeak hours, and you'll have saved enough to get a faster modem before you know it.

On the page of the Fax Wizard that asks about cover sheets, more Fax



Fast Fax: To fax a Word for Windows file, say, from Explorer, right-click and select Send To. Fax Recipient.

options are available. Click on the Options box and you'll see them. (You can get similar options from Exchange's Tools, Fax Tools, Options menu.)

Under Time to Send, either select a specific time or click on Set Discount Rates, and enter the beginning and ending times of your telephone company's discount rates.

#### Judge a Fax by Its Cover You get several sample fax

Tou get several sample has cover sheets with Windows 95. The problem is, so does everyone else who bought Windows 95. And nobody wants to send out the same cover page as everyone else. So you need to get into the Windows Fax Cover Page Editor (you'll find it in the Accessories group).

This editor is not like a regular word processor. Sure, it has editable text. You can paste graphics from the Clipboard into a sheet. And it has fields for sender name, number, and so on, just like word-processing mail merge.

But it's really a very labor-intensive agout program. It has drawing tools. It has a snap-to grid that's invisible unless you select View, Show Gridlines. And trying to get a preview of how the page will look in real life is a frustrating exercise. This is nothing unusual in the world of forms design but it's a bear it you're more of a wordprocessing type of person.

**Quick Tip:** The easiest way to preview and zoom on a fax cover page as you're putting one together is to select File, Print Preview.

However, you can generate a distinctive fax cover sheet without having to learn much about forms design. Simply figure out in advance the display items you want (logos, lines, or bitmaps) and the information you need to convey (to and from names and numbers, notes, and so on). Then click on the Start button, select Run, type in FAXCOVER, and press the Enter kev.

Quick Tip: To help orient yourself and line up elements as you put together a cover sheet, select View, Gridlines. The solid vertical line marks the center of the page.

To insert a logo or another kind of graphic image, you select Insert, Object, and click on Create from File. Then you search your hard disk for the BMP and



Brand-Name Recognition: Don't use generic fax sheets—import a logo that says something about your business in the Fax Cover Page Editor.

Continued on page 298

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Continued from page 294

#### **GUIDED TOUR**

HOW EXCHANGE HANDLES ALL COMMUNICATIONS NEEDS

Grand Central: The Microsoft Exchange Inbox in Windows 95 is a misnomer. It doesn't just provide a container for your incoming mail—it lets you store addresses, send faxes, handle e-mail, and more. Although personal information management is more talked about than practiced, take a look at the options for maintaining your address book in Exchange. Not only does the Address Book provide one-click access to composing internal e-mail, but it can also send faxes and Internet e-mail through Microsoft Network (MSN).



Finding Pen Pals: It's just two steps from the Inbox icon on the desktop to the Address Book: Once you're in the Exchange Inbox, press Ctrl-Shift-B.



Grouping: You can maintain several address lists under Exchange— Postoffice for your LAN, or for your Personal Address Book.



Sending Method: After selecting the Personal Address Book, you're asked to define the type of entry—Microsoft Network. Fax. or Microsoft Mail.



Add an Entry: From the Properties box, you can fill in details under various tabs but only the first page you see requires a name and number



Mass Mailing: To send messages to an impromptu mailing list, hold down Ctrl and click on names in the Address Book to select them. Then click on the envelope button.



Audit Trail: To change the sending priority, or to request a receipt notification either select File. Properties or click on the Properties button, You can also view these properties in incoming mail.



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#### Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

Continued from page 298

select Insert. For other graphic formats, you'll need to paste from the Clipboard. Next you drag the graphic image into place, and, if necessary, resize it by dragging on one of the square "handles." To draw a line, box, or polygon, you clike on the appropriate tool in the toolbar. To adjust the line thickness or the fill of a shape, you select Format, Line Fill and Color.

Quick Tip: When drawing a graphic image, if you want to extend a line beyond the visible portion of the screen (remember that you can't scroll and draw at the same time), scroll down, click on the graphic until its boundary line appears to show that it's selected, and drao it.



This Is Not Desktop Publishing: The Fax Cover Page Editor is more like a mail-merge document builder than a polished page designer.

To include generic text, click on the text button (the one with "ab" on it). Draw a frame in which to enter the text and line it up with the other graphics. Select the font and point size from the toolbar. Then enter the text. (You may need to resize and reposition the text frame as you go.) To center or change the alignment of the text, select Format, Align Text. To insert mail-merge-style fields, select Insert, and choose from Recipient, Sender, and Messages. Be sure to include at least the recipient's name (Insert, Recipient, Name), as well as your name (Insert, Sender, Name), the number of fax pages being delivered (Insert, Message, Number of Pages), and room for a note (Insert, Message, Note).

Expect to spend a while after you have all the elements on the page making sure that everything's spaced nicely. This is a cumbersome process—switch-ing over to Print Preview, sizing up the alignment of all the elements, and pressing the Close button to go back to the detting window. But a few minutes spent liming things up now will make the or result all the more impressive.

#### HyperTerminal: Not So Hyper

You've heard the hype: What people want from a modem is contact with exotic graphical wonderlands from the World Wide Web to America Online to Prodigy all the way down to valiant attenting to the trofitting CompuServe. But in reality, Windows 95's general-

purpose communications software is simply a terminal emulator called Hyper-Terminal with an interface that shows a mess of text and nothing else.

To give HyperTerminal its due, it's a lot better than Windows 3.1's Terminal. And it's just the thing for contacting almost any bulletin board, Internet gopher service, general purpose e-mail services such as MCI Mail, or even CompuServe (in terminal mode). How do you hook up' you hook up' you hook up' you hook up' you hook up'.

ment Fire up HyperTerminal, and you'll be greeted with a new connection description box. If you or some other Windows 95sters have already created a HyperTerminal connection, just cancel

Windows 95sters have already created a
HyperTerminal connection, just cancel
this screen and click on the open icon
(or press Alt-F-O). If not, read on.
With the New Connec-

With the New Connection dialog box open (click on File, New Connection if the dialog box is closed), enter a name, and click on an icon. Then click on OK. Enter a phone number in the phone number box and click on OK. In the Connect box, click on Dial.

This technique will work for you practically every time. However, in some cases you'll connect to a



Stop Squealing: To change modernspeaker volume, forget AT command strings—use the slider control instead.

bulletin-board service or online service that produces nothing but garbage characters when you dial in.

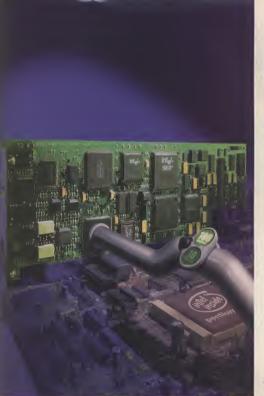
Note that in most cases, Hyper-Terminal adjusts the parity and data bits by itself during handshaking—the squealing time when the two modems are exchanging information.

Almost every time this happens, you'll have a vague recollection that someone described the service as "ETI," or "7 data bits." Most bulletin boards and services use 8 data bits, 1 stop bit, and no parity (don't ask, you don't want or need to know). This is usually described with the shorthand N-8-1.

CompuServe, on the other hand, uses 7 data bits, 1 stop bit, and even parity. Most of the time when you dial CompuServe numbers, HyperTerminal makes the necessary adjustments. But if you dial something like CompuServe's ever-



In the Twinkling of a Protocol: Click on one of HyperTerminal's Transfer buttons and you'll be sending and receiving files in no time.









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#### Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

Continued from page 304

favorite access number database at (800) 346-3247 and get nothing but trash on screen, you need to take a few extra steps, as follows:

Select Connect, elick on Medify, then Configure. In the Configuration dialog box, check out the Connection tab at the top. When you click on it, you'll see a Connection preferences box where you can change the data bits, stop bits, and parity. Do what needs to be done. Click on OK, then on OK in the next dialog box. Now you're in Connect again. Click on Dial and get online.

#### When Online ...

What do you go online for? Three things, mainly to gather information, transmit or upload files, and receive or download files. Gathering information is something you can do on your own—with a little help from HyperTerminal's terminal emulation, which syncs up nicely with the remote computer. Sending and receiving files takes a little more information.

Quick Tip: You'll never remember what you saw online if you rely on your memory alone. Instead, save a Hyper-Terminal session to a file. Just select the Transfer menu's Capture Text option, and enter a filename.

The fact is, transferring anything across the phone line is a process that's fraught with errors. Terminal emulation takes care of simple stuff like transferring plain text at typing speed. Sending kilobytes at a time, though, takes an error-

correcting protocol, and since the introduction of Xmodem in 1979, there have been fistfuls of them. Hyper Terminal offers six, several of which will probably match up with those offered by whatever bulletin board you're dailing in to. The knack is to pick the fastest and most robust that HyperTerminal and your BBS can support. Check "Your Modem's Best Ports

Section 5 (Colored Colored Col

One-Stop Mail: Don't log in to MSN and your workgroup mail separately—select the misnamed Deliver Now to pick up mail from the listed sources.

of Call" (below), for a few pointers.

Once you've picked the best protocol

Once you've picked the Best protocol that both Windows 95 and the BBS you've dialed in to can handle, to begin the download or upload you generally have to make a menu selection in the text-based service you've dialed in to.

The service itself will prompt you with the commands for the protocol (press Y for Ymodem, Z for Zmodem, or whatever) and the filename. Once you've selected them, click on the transfer icon (upload or download) on the toolbar. In the dialog box that pops up, select the same protocol in the Protocol box, and enter the appropriate filename.

If you're uploading a file and aren't quite sure of the spelling (don't leave it to chance—it's a big pain to restart a file transfer), click on Browse and select the filename in question. Whether you select to upload or download a file, you'll get a dialog box to keep you updated on the progress of the transfer. There's little to choose between the dialog box to.

Quick Tip: Create shortcuts to each connection you've set up. Use Find to dig up ".HT files, and right-drag the ones you use most often onto your desktop or into a folder.

#### Microsoft Network

Is the Information Supercliché finally catching up with you? Have you decided to try out Microsoft's on-ramp?

Microsoft Network—MSN to its friends—is smaller and easier to manage than the Internet. And while Microsoft

#### FYI YOUR MODEM'S BEST PORTS OF CALL

HyperTerminal's protocols in order of preference:

Protocol	Pros	Cons
Zmodem	Fast, dynamic allocation of block size is optimized for line conditions.	If line conditions are bad, Zmodem's robust error correction can keep holding up the transfer, or quit it. HyperTerminal's implementation seriously underreports transfer times.
Ymodem-G	Uses hardware error control in modem, big 1K blocks transferred.	Can't use it with moderns that don't have hardware error control.
Ymodem	Transfers in 1K blocks, very common.	Middling transfer speed.
Xmodem-1K	Practically the same as Ymodem.	Middling transfer speed.
Xmodem	The most common error-correcting data protocol.	Sluggish transfer speed, mainly because of its now-undersized 128K fixed-size blocks.
Kermit	Flexible, cross-platform solution used on DEC, VAX, IBM, and other mainframes. Supports wildcard transfers (such as *.TXT).	Sluggish transfer speed. Named after a Muppet. (We're not making this up-Kermit was formulated in 1981 by college types. What else would it be named after?)

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#### Windows 95 MAKING IT WORK FOR YOU Reach Out: Fax and Telephony

#### WINDOWS FIXER

DON'T DALLY ONLINE

It makes no sense to hold up your phone line while you're doing nothing. Here are a few tips for getting in and out of the Microsoft Network (MSN) as fast as possible:

. If you find a couple of places on MSN you visit often, select File, Add to **Favorite Places** 

· Alternatively, drag icons onto the desktop. That way, a double-click on

the icon will launch MSN and connect to the chosen place right away.

. On MSN's home page, select View, Options, General, and specify when you want MSN to hang up automatically if there's idle time.

 Set your Exchange preferences to disconnect from MSN immediately after receiving mail. In Exchange, select Tools, Options, Services, click on Microsoft Network, and select properties.

isn't responsible for the accuracy of all the content, MSN is populated with more reliable information than much of what's on the Great AlGoreWay (that is, MSN is not 28 million channels of public access television). This is not to say that you shouldn't use any other commercial online service, but if you're interested in checking out MSN, read on.

Setting Up MSN First, you need to set up MSN access software and the Microsoft Exchange client (which is your virtual mail system for sending and collecting your MSN and other e-mail). If you haven't already installed the software, be prepared to kiss 6 spare megabytes good-bye for a full installation.

As with any installation, you go the route of My Computer, Control Panel, Add/Remove Programs, and then click on the Windows Setup tab. Slap the Windows installation CD-ROM into your CD-ROM drive (if you have one) or get the floppy disks ready if you don't. Then click on the check box for Microsoft Network and Exchange.

If you miss Explorer, the Add/Remove Programs Wizard will prompt you. Once you've clicked on OK and the installation is complete, you'll probably need to restart Windows.

Now you're halfway there. The Start Menu's Programs list will have the Inbox, Exchange, and MSN in it-and so will your desktop. But you won't have configured Exchange-which is essential.

The first step is to create a profile with information about configuration, where your incoming mail is likely to be coming from, your personal address book, and so on. Here's what you need to do:

In the Control Panel, double-click on the Mail And Fax icon. Click on Show Profiles, and then click on Add. A wizard will guide you from there. To add a service to your default profile, click on Add, and then click on the service. Select MSN, and you'll be jamming.

Plugging In to the Network OK, now you're really ready. Click on the MSN icon. After you see a screen that asks if you're already a member (which we'll assume you're not), you'll be asked for the first three digits of your phone number. The MSN software uses these numbers to find the local access number nearest to you, and dials in.

The dial-up takes a while as it updates the database of local access numbers, then you'll be faced with a series of log-in commands (be prepared to give your credit card number—them's the breaks).

Quick Tip: To find out more about Microsoft Network before you hand over important details, right-click on the sign-on screen.

Logging Back On Hereafter, it's easy getting into MSN-just type your password. Your member ID will be there, ready for you every time you start the MSN application.

Quick Tip: Entering your password every time you log on to MSN can be tedious-but it's secure. If you're absolutely sure that nobody can abuse your account, click on the check box next to Remember My Password.



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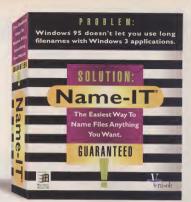


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HOW IT ALL COMES TOGETHER

## **Team Spirit: Using Windows Apps**

ou probably already know this, but just in case, let's get this information out in the open: An operating system is worthless without applications. Its value is in the applications that run under it and in the way they work together. In other words, an operating system is the infrastructure that makes everything else possible. In this chapter,

we'll examine the different ways Windows 95 can run your applications. We'll use the freebie applets provided with Windows 95 to demonstrate the power and functionality available to all true Windows 95 apps. But first, we need to get some technolabble out of the way.

#### Esprit de Corps

No application is an island. Even if all you ever do is write in your word processor, you're inevitably interacting with the rest of the system: fonts, Clipboard, Print Manager, file-management tools, and so on. But chances are, you probably use much more than one application. Windows 95 lets you use several applications at a time. The number of apps you can open depends on your system's power—processor speed, hard-disk space, and memory.

Why would anybody want to run more than one program at a time, you ask? Well, how about listening to "Sgt. Pepper's Lonely Hearts Club Band" on CD via your CD-ROM drive while you're writing? Add to that mix your favorite personal information manager (PIM), with the names and phone numbers of all your clients and friends, and a program that receives a live feed of stock information from the New York Stock Exchange. Oh, and a spreadsheet that takes all those numbers and displays them in a line graph in real time. Now you're a power user. You're multitasking. You can quickly switch between any of these running applications and copy data between them, all the while humming along to "With a Little Help from My Friends." Remember, computers weren't the first machines to walk and chew gum at the same time. We were.

Windows 3.1 could also walk and chew at the same time. The problem was that its stride was more like a limp. Often, it just fell flat on its face, gum stuck in its hair. Downloading data in the background? Forget it. Running multimedia applications in separate windows? Not too convincingly. That? because Windows 3.1 used so-called

cooperative multitasking where applications wasted your time saying: "You go first;" "No, after you," "No really, after you." Windows 95's preemptive multitasking is more of a drill sergeant, ordering each application to work more or less as a team.

Read on. We're about to get a little hands-on practice with some of Windows 95's applets. And while we're there, we'll multitask and experiment with more of this operating system's team-spirit features.

#### The Clipboard

Not long ago, in the dark ages of DOS, you were plugging away inefficiently, duplicating data entry between applications. Numbers from your spreadsheet had to be retyped into your database, then into your word processor. Then Windows came along, introducing the Clipboard

ducing the Clipboard Continued on page 324

#### WINDOWS FIXER

THE MOTHER OF ALL SHORTCUTS

If you're like us, you have all kinds of shortcuts on your desktop for the most common operations. The problem is, when you have several applications open, there's no easy way to get to the shortcuts on your desktop. Sure, you can minimize all the running apps by right-clicking on the Taskber and selecting Minimize All Windows, but that might be too much work. (You must first find an unoccupied part of the Taskber in order to right-click on it, and if you'd rather use the keyboard for everything, this is a real nuisance.)

What you need is a shortcut to your shortcuts. Open Explorer or My Computer and look for the Desktop folder inside the Windows folder.

Right-drag the Desktop folder to your Desktop to create a shortcut. Right-click on that icon, select properties, click on the Shortcut tab, and rename that shortcut if you wish. From then on, you can switch to the desktop by pressing Alt-Tab Get into the habit of double-clicking on that icon to open that folder.

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## Windows 95 MAKING IT WORK FOR YOU Team Spirit: Using Windows Apps

Continued from page 320



**Word Lite:** If you're saving a WordPad file with fonts, graphics, or even OLE objects, use the space-frugal RTF format.

with it. But to this day, many users overlook this wonderful capability. What does the Clipboard do for you? It temporarily holds on to data you copy or cut from our application or document, allowing you to paste it in another location. The Clipboard's one glaring weakness is that it can hold only one piece of data at a time, but see "Using Scrapt to Enhance the Clipboard" (on page 336) for ways to overcome that handicap. Here are the standard ways to use the Clipboard:

- Ctrl-C to copy a selection to the Clipboard.
- · Ctrl-X to cut a selection.
- Ctrl-V to paste Clipboard's contents at the cursor's location.

How do you use the Clipboard to schlep stuff between different apps? Select part of your document, press Ctrl-C or Ctrl-X to copy or cut it to the Clipboard, then press Alt-Tab to switch to the receiving application. Place the cursor where you want to insert the selection, and press Ctrl-V. Nothing to 1

#### Applets of My Eve

Windows 95's freebie applications (being the cute little things that they are, they're fondly referred to with the diminutive term applets) are all found in the Accessories folder, nested deep inside Programs, which is inside the Windows folder. Get to them by clicking on Start, then select Programs, Accessories.

WordPad This compact word processor has plenty of features to satisfy the occasional memo writer or note taker. It's not a full-blown word processor—or it would compete with Microsoft's real word processor, Word for Windowsbut it's a good, fast substitute. Open it, and click on Formatted File (if you're prompted to).

WordPad can save files in one of three formats:

of three formas:

Word for Windows 6.0 (DOC)
format is stuffed with fonts, formatting, and OLE 2.0 readiness
(more on this later). WordPad
can open files created in Word,
but when you resave them in
WordPad, you may lose quite a
bit tables, headers, columns, etc.

\*Rich\* Tex\* Format (RTP) is the

text exchange format recognized by many Windows apps. RTF preserves fonts and other text attributes, but strips advanced format-

ting features from the document.

• Text (TXT) saved in the ASCII format is

Code of the first of the code of the code

Word Doesn't Have This: WordPad's text-color menu doubles as a lexicon of color names for the teal-impaired.

the fastest way to fly—no extra formatting baggage, just straight words, numbers, and carriage returns.

Which one do you save your documents in? That decision depends on whether you want to save disk space or preserve the little formatting that Word-Pad affords you. Once you figure out the real estate you save by going the RTF route, you'll be using it exclusively.

Quick Tip: To turn off the opening dialog box prompting you for Formatted or Text files, select View, Options, and remove the check from the box next to Prompt for File Type.

Your WordPad screen starts out looking like a plain white box framed by title, menu, and scroll bars. Dullsville. Select View, and, one by one, select Toolbar, Format Bar, Ruler, and Status Bar. There. Now it looks like a real word processor. Move your mouse pointer over any icon on the Toolbar and a revealing label soon pops up (Microsoft calls these "tooltips"). That's all there is to this program. No macros, no merges, no problems.

Let's try a quick document.

Type two short paragraphs (No idea where to start? Just pick a couple from this page,) Don't indent the first lines in the paragraphs. Now select a word by double-clicking on it. Click on the drop-down arrow next to the font box and select any font you want. Click on the drop-down arrow next to the size box and change the text size (the word should still be selected at this time; fif is not, reselect ii). Click on the color-palette icon and apply any color you want. While you're at it, click on the Bold, Underline, and Italic hutton the Bold, Underline, and Italic hutton the

#### Quick Tip: You can also press Ctrl-B, Ctrl-U, and Ctrl-I for bold, underline, and italics, respectively.

Time to select the entire text. You could drag your mouse arrow across the whole document, but this doesn't make sense when you have more than a screenful of text. Try this shortcut instead: Press Ctrl-A (like many other Windows 95 keyboard shortcuts, this is a mnemonic nobodly gets at first glance—it stands for Select All). Apply any font you wish. While the text is still selected, right-click anywhere in the document. A context-sensitive menu pops up. Select Paragraph. Click inside the First Line box, type-0.5, and select OK.



Hanging Indent: Select text in WordPad and right-mouse-buttonclick on it to set indentations.

Continued on page 328 SEPTEMBER 1995 # Start

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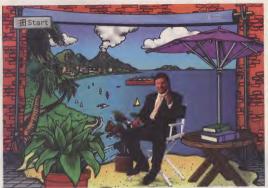








## "A Funny Thing Happened on My Way to Learn Windows 95"



FROM The improv Presents Windows® 95 For The Technically Challenged — One of 16 hilarious comic coaches, Tony Robotics, supermotivator and pitchman, sells you on Windows 95. Operators are standing by!

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## Windows 95 MAKING IT WORK FOR YOU Team Spirit: Using Windows Apps

Continued from page 324



Flip This: Once you've drawn an object in Paint, select the Image, then select Flip or Rotate and you'll be able to create a mirror image of it.

right, Mom," just launch Paint and entertain yourself by making geometric shapes of all colors and sizes. Some of the most creative artwork of the twentieth century has its origins in long phone calls from relatives. Paint creates and edits

bitmap graphics (BMPs), the lowest common denominator of all graphic formats.

Quick Tip: Need to edit a PCX file? If you still have a copy of the Windows 3.1 PaintBrush applet, associate the .PCX extension with PaintBrush, or add a short-

cut to this program in your SendTo folder. (In "Housekeeping: File Management," see page 212 for info on creating associations, and page 218 for more on the SendTo folder)

Why is that exciting? It's not, really. But if you want to create a list, it'll come in handy, Just go to the first character in each paragraph and type a number followed by a period and a tab, and your numbered list is aligned and well.

If you fancy a quick- and-dirry bulleted list instead of a more-laborious-to-create

You've just created a hanging indent.

If you fancy a quick-and-dirry bulleted list instead of a more-laborious-to-create numbered one, just select the text you want in the list and click on the Bullets button. For good measure, slap a date and time stampat your cursor's position by clicking on the Date/Time button and selecting a format from the drop-down box.

To save the document, select File, Save As. Select Rich Text Format under Save File as Type, and type anything for the name. You're limited to 255 characters, and not all characters are allowed (see "Housekeeping: File Management," on page 200, for a list of forbidden characters). If, when you select OK, the dialog box doesn't go away, you can be sure that you have some offending characters in the filename. For now, stick with letters, numbers, and hyphens.

OK. That's enough to get you started. Now exit by clicking on the Close button on the title bar or by selecting File, Exit. On to the next applet.

Paint You don't have to be an artist to use Paint. This is a rudimentary graphics tool that can serve you when you need to draw a rough sketch. It's a hit with childern but it's also very popular among dodlers. Long, boring phone call from your mother? Rather than stare at the wall as you keep saying, "Yes, Mon. You're Ready or not, we're going to attempt a drawing. Open Paint if you haven't done so yet, and click on the circle-shaped drawing object at the bottom of the toolbar. Click anywhere on the screen, then drag the mouse pointer until you achieve a circle, and let go of the mouse button. Not happy with the shape or size? Select Edit, Undo, and start over. If the line is too thin, click once on the diagonal line button (two above the circle) and select a different line width from the options below the toolbox. Reselect the circle object and draw the circle. If you're

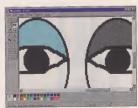
happy with your results so far, hurry up and save. Select File, Save As, and type whatever name comes to mind.

To draw the eyes, we'll use only one circle. Draw a circle somewhere outside the main one. Now click on the selection tool—the dashed-frame object at the upper-right corner of the toolbox—and drag a frame around the smaller circle. If the circle seems too large or small, move the mouse button to one of the handle bars (the tim y squares at the

frame's corners), and when you get a double-edged arrow, drag the frame to resize it. Quickly resave by pressing Ctrl-S. Select the paintbrush object and carefully draw the eyelid and eyeball inside the small circle. Resave, Select the eraser from the toolbox and carefully erase the portion under the eye. Resave. To paint the eye shadow, click on the paint-can button and select a color from the palette. Move the paint-can pointer to the space between the upper lid and the eyebrow, and click to fill. If the paint fills up the entire screen, select Edit, Undo, and select the paintbrush object to manually color any opening between the eve and the eyebrow.

Now repeat the paint-can operation, You know the drill—save again. Do it at the end of each step and we won't have to harass you anymore. Click on the selection tool, draw a frame around the eye, then right-mouse-button click and select Copy. Once again, right-button click and select Paste. Drag the new eye from the upper-left corner of the screen and position it to the right of the first eye.

To flip this new eye so that you get a mirror image, select Image, Flip. Make sure that the check box next to 90 degrees is selected, and pick OK. Draw a selection frame around both eyes and drag them to the appropriate place in the larger circle. Select the paintbrush object again, and carefully continue the lines from the boxtom of the eyes to form the shape of a nose. Draw the mouth using the line or the paintbrush. Select a different color from the color palette and click on the paint can the color palette and click on the paint can



Flood of Color: Change the hue of any block of color that has a border around it using the flood fill tool (the paint being spilled from a can).

Continued on page 332 SEPTEMBER 1995

## "Most Bang For The Buck" Maximus' - Magna Media





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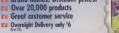
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## Windows 95 MAKING IT WORK FOR YOU Team Spirit: Using Windows Apps

Continued from page 328

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💯 Moonbits - Paint	
File Edit View Image Opti	ions <u>H</u> elp
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Save	Otrl+S
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Print Preyiew	
Page Setup	
Print	Ctrl+P
Send	
Set As Wallpaper (Tiled)	
Set As Wallpaper (Centered	
1 Moonbits	
2 Moon	
3 Jubba	
4 D:\Poomstl	
Exit	Ak+F4

Instant Glue: It's faster to change your wallpaper in Paint than through the desktop's Properties sheet.

to fill in the face with that color. Check out page 336 for our final product.

There are only two possible outcomes to the tour de force you've just completed: Your drawing is either worse than ours (not very likely) or much better (we're putting money on this one). Print it. Select File, Print, or press Ctrl-P.

Quick Tip: To repeat an object on the screen, select it, hold down the Shift key and drag the object all over the place. To draw a spring, for example, draw a circle and Shift-drag.

Nobody really likes any of the wallpaper offerings that come with Windows. We've already established that any BMP file can be used as wallpaper-even the moonface you just slaved over a hot CPU to cook up. It's extremely easy to do, too. From Paint, select File, then pick one of the Set As Wallpaper options-either Set As Wallpaper (Centered) or Set As Wallpaper (Tiled). The Tiled option repeats your masterpiece across the screen as many times as it fits. The Centered option speaks for itself. If the image isn't quite centered, you'll need to reopen Paint, select the image with the frame object, move it to the right, save and exit. When

you return to the desktop, the original placement is still in effect, so repeat the wallpaper-selection process, and the new image settings will be in place.

If you're not confident enough to use your own original artwork (like one artistically-challenged coauthor of this book), you can always mutilate someone else's. One favorite trick of ours is to take a snapshot of part of a Windows screen and make it into wallpaper. It could be anything. A group. A dialog box. Some icons. To capture the image of your entire

screen, press the Print Screen key on your keyboard. For a screen shot of only the active window, press Alt-Print Screen. Then move over to Paint, select Edit, Paste (or press Ctrl-V) and save the image. (Yes, as a matter of fact, that's how we often get screen shots. Now, go write your own book.) Enough doodline.

Calculator There's not much one can say about the pop-up calculator. It's self-explanatory and easy to use. If you constantly refer to a calculator but don't need a

calculator but don't need a full-blown spreadsheet, this tiny applet will be a perfect candidate for inclusion in the Startup Group. Here's how:

Open Explorer, select the Windows folder, then Programs, then Accessories. Right-click on the Calculator icon and select Copy. Click on the drop-down arrow next to the folder box and select the Programs folder. Double-click on the Startup folder. Right-click anywhere in the Startup folder and select Paste. One last thing. You probably want the calculator to appear minimized on the Taskbar. To do so, right-click on the Calculator icon,

so, right-click on the Calcu select Properties, and click on the Shortcut tab. Click on the Horp-down arrow next to Run, select Minimized, and click on OK. Close the folder. Next time you start your computer, the calculator will automatically start and shrink itself onto the Taskbar. Repeat this process for any applet or application you wish to load automatically at start upt time.

Quick Tip: There actually are two calculators: standard and scientific. To switch between them, select View. The scientific calculator is popular among students, programmers, and subscribers to *The Joy of Hex*.

Character Map This tiny applet shows you each character set separately, and lets you copy characters to the Clipboard so that you can paste them into your documents. Click on the drop-down arrow next to the font box

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( Hes	(C)	Dec	C Oct	G Bn		∩ Dwo	and "	Word	6.8	yte
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Dat	ton	×2	1/x	PL	. A	1 8	.0	n	E	F

The Joy of Hex: The scientific calculator includes functions for high school trigonometry as well as for binary and hex conversions.

and select Wingdings. This will show you the entire collection of tiny graphics. To zoom in on any of the characters, move your mouse pointer to the one you want and press the left mouse button. Note the box in the bottom-right corner of the window, where the equivalent keypress is revealed. Not all Wingdings are achieved by typing single characters. Some are numeric values you type by holding down the Alt key while typing the number on your keyboard. For example, to get the Star Tree bullem you would type Alt-20217.



Windows 3.1 Legacy: Character Map sends symbols to the Clipboard—and it's still the only applet you can quit by pressing the Esc key.





Insufficient memory to run this application. Quit one or more Windows applications and then try again.

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## Windows 95 MAKING IT WORK FOR YOU Team Spirit: Using Windows Apps

Continued from page 332

#### STEP BY STEP

USING SCRAPS TO ENHANCE THE CLIPBOARD

Clip 'n' Save: The Clipboard in Windows 95 is not a great improvement over its predecessor in Windows 3.x—it still holds only one item at a time, which makes it more of a nuisance than a useful tool. But Windows 95 has introduced the concept of Scraps, which are items you can paste onto the desktop or into any folder for temporary storage, until you paste them where they need to go. Scraps can be dragged to the desktop or pasted through the Clipboard.



 Safekeeping: To create a scrap, mark a selection in your application, right-click on it, copy or cut to move it to the Clipboard, or drag it off the screen and drop it on the desktop, which then serves as a pasteboard.



2. Pretty Face: Windows 95 creates a Scrap icon where you drop the selection. Since you're going to work with more than one scrap, you should give it a meaningful name now.



3. New File: The corresponding filename (to the Scrap icon) has the extension SHS, and it's pretty smart: It knows which application and document it was created in.



4. Linked:
Double-click on a scrap, and it launches the appropriate application. You can make changes to it, then update the scrap or save it as a different file.



5. Use the Scrap: Drag a scrap to any Windows 95 application and it'll get pasted at the cursor location. Or use the Paste command, which is less fun . . .



Camille

WordPad Document Scrap 'Time for tea and...' 6. Smart Label: When you create a text scrap, its label displays the first few characters in it, making it easier to identify the icon at a plance.

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#### **MAKING IT WORK FOR YOU** Team Spirit: Using Windows Apps

Continued from page 336



Clipboard Clear: Who wants to have their Clipboard cluttered? Select, Edit, Delete to clear its contents.

Clipboard Viewer Remember the Clipboard? Whether you liked it or not, you worked it to the bone in this chapter. Clipboard Viewer is a utility for viewing and managing the Clipboard's contents. Not too valuable, keeping in mind that the thing can hold only one piece of data at a time. But there are times when you'll want to peek into it. If your system acts up or performs on the sluggish side, there may be a humongous chunk of memory-hogging data in the Clipboard. The fact that you've already pasted it somewhere doesn't mean it's out of the Clipboard. It'll stay there until your next copy or cut or until you power down the PC. So launch Clipbook Viewer, and, wouldn't you know it, there's Jabba the Hutt staring at you, munching on your system resources. (Hey, Jabba, nice do!)

We can kill this monster faster than he can say Obi-Wan Kenobi, Select Edit. Delete from the menu bar, say Yes when the system doubts your sanity. and the Clipboard will be cleared.

#### A Little Help from My System

As you work your way through the various mazes that make up your Windows 95 system, you may at times feel losteven helpless. But with the extensive built-in Help system, you should find your way out of any dead-end situation. All it takes is one key-F1-and the Help engine springs into action. Sometimes you'll get the main Windows Help screen; other times you'll get a contextsensitive Help screen for the application or environment you're in.

Quick Tip: If you press F1 on the desktop and nothing happens, click anywhere on a blank area on the the desktop and press F1 again.

The Help screens contain hypertext links, which are dynamic markers that take you to other screens. Move your mouse pointer over the text. When it changes to a pointing hand, you've discovered a hypertext marker. Those markers may look like gray square buttons or like buttons with curved arrows on them. Just click on one, and it'll take vou somewhere else.

There are three tabbed screens within the main Help screen: · Contents This is a hierarchical table of

> contents for searching topics by category (useful if you're not sure what the feature you're looking for is called). Click on any of the book icons to see the entries.

· Index This is an alphabetized listing of all the Help topics. Type the first character or characters of whatever you're looking for, and it'll take you there.

· Find Not sure what the topic is, but you know that a certain word is included in its Help screen? Use Find's full-text search capability to scan all the screens for that word or phrase. When you first try to use Find, you'll need to run the Find Wizard, which creates a database of all the searchable words.

#### Taking Notes with Help

If you're ever in a Help screen that you suspect you'll need to return to, you can use the Annotation tool to enter your own notes. This is especially handy if you share your system and want others to see your comments. Select Options, Annotate, type in your comment, and click on Save. You'll notice that a tiny paper-clip icon has been added to the current Help screen. To view the note, just click on the paper clip.

Quick Tip: Right-click anywhere in a Help screen to get the Options menu.

#### Reusable Help

You can copy the contents of a Help screen to the Clipboard to be pasted somewhere else (the most logical place is in a word processor). Just right-click anywhere in a screen and select Copy. The



Now That's Helpful: Windows 95's troubleshooting Help engine can run applications that it refers to.

entire screen will be copied to the Clipboard. Now go to your target application and press Ctrl-V to paste it.

Quick Tip: You don't have to copy the entire Help screen. To copy only a portion of a Help screen, select the area you want with your mouse, then press Ctrl-C.

#### Get the Most out of Find

Find is a three-step process. First you type the word you're looking for, then you narrow the search a bit, then you Continued on page 346

Nest Cancel Fiendish Wizardry: Before you can take

advantage of Help's Find engine, you must run the Find Wizard, which indexes all the text in Help files.



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### Windows 95 MAKING IT WORK FOR YOU Team Spirit: Using Windows Apps

Continued from page 340



What's the Application? The title bar is a dead giveaway: You're in WordPad, editing a Paint object in a WordPad document. OLE magic.

narrow the search some more. Let's say you want to find out how to start a program whenever you launch Windows. Type start at the Step 1 box, then click once on each of the topics in the Step 2 box to see more options in the Step 3 window. When you find your match, click on Display to see your topic.

Quick Tip: Click on the Options button and select Show Words that Contain the Characters you type so that you don't limit your search to the first characters of a topic.

#### OLE!

One of the most talked-about (and controversial) features in Windows 95 is its enhanced Object Linking and Embedding (OLE 2.0) capability. Think of OLE as the give that holds your applications and operating system together. You may embed a portion of a spreadsheet inside your word-processed document, then launch the spreadsheet by double-clicking on that object. We know this is ho-hum news to most Windows users, but Windows 95 adds a few nifty tricks to your OLE toolkit, and they're worth examining.

#### Copy, Paste, Done

At its most basic form, OLE is used as follows: You copy or cut an object to the Clipboard, then paste it in another application. Say you copy your masterpiece from Paint. Switch over to Word-Pad, put your cursor where you want to embed that object, and press Ctrl-V to

paste it. Nothing to it. Now double-click on that object, and you're in Paint. Or are you? Look at the screen to your left. In reality, Word-Pad is a clever chameleon and has taken on some of Paint's attributes. Edit the object and click anywhere outside it. The toolbar changes back to Word'Pad's.

Caution: OLE is a very sluggish operation, even on the fastest computers. Use it only when you must, or you'll bring your system to a screeching halt. A document loaded

with OLE objects is generally very large and takes forever to load and save. Worse, even if you delete the OLE objects from that document, you can't get rid of all the OLE overhead, so it may still be huge.

To examine the contents of an embedded object, right-mouse-button click on it and select Object Properties. Click on the View tab, and you can change the object's appearance from the actual bitmap to an iconic representation. You can edit both types of objects by double-clicking on them.

#### **Embedding Shortcuts**

In addition to the standard OLE fare, you can also embed shortcuts in documents. For example, you can send a

memo to a colleague with an embedded shortcut pointing to a document on the network. The recipient can then open that document by double-clicking on the shortcut icon in the memo.

The screen at right is a WordPad document with a shortcut embedded. The icon has been disguised, but it's still just a shortcut. When Ringo opens this document and double-clicks on Lovely Rita, the baby's picture, in all its glory, will fill juth escreen.

Here's how you do that: Type your memo in WordPad. Make sure that WordPad isn't maxmirzed (elike on its Restore button), Right-drag the CD Player shortcut from the desktop, Right-click on the embedded shortcut object and select Package. Object, then Edir Package, The Object Packager lets you change some of the attributes of an OLE object. In Object Packager, click on the icon, then select Edit, Label. Type any label you want. Click on Insert Icon, and browse your hard disk for an appropriate icon. Select File, Update, then File, Exit.

#### Scrap: Tricking the Clipboard

As we said before, the Clipboard can hold only one item at a time. That's an annoying limitation, and one we're about to fix. Windows 95 lets you save multiple "scraps," or Clipboard contents, to any folder, including the desktop. Let's try that:

Open WordPad and type a few lines into it (or open an existing document). Select a word or sentence, and press Ctrl-C to copy it to the Clipboard. Switch to the desktop and press Ctrl-V. That embeds a scrap object in the Desktop folder. Back in your document, select another word or phrase and drag it out to the desktop. Same result (although some hand-eye coordination may be necessary). Want to go back to any of the scraps? Just double-ciked on its icon, which will open WordPad with the seran's contents in the documents

Quick Tip: To avoid desktop clutter, create a Scrapbook folder on your hard disk and paste your scraps on it.



Get a Load of This: Embedded objects in OLE containers like WordPad documents can be shown as icons (which you pick at will).



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  - Mail Transports Includes transports for the Internet using TCP/IP and any MAPI compliant LAN mail system.

- Data Security Supports Internet firewalls and secure e-mail messaging.
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### Windows 95 MAKING IT WORK FOR YOU Team Spirit: Using Windows Apps

#### STEP BY STEP

EMBEDDING SHORTCUTS IN DOCUMENTS

Launch Pad: If you haven't figured out shortcuts yet, they are just pointers to files, to make it easier for you to Jaunch programs from anywhere. These are tiny (usually 1K) files, with the extension LNK. The most obvious place for shortcuts is on your desktop and inside folders, but you can also embed them in e-mail messages and word processing files, and the recipients launch the linked applications from within those documents by double-clicking on the shortcuts' icons. And the best part is, shortcuts can be embedded in non-Windows 95 applications as well.



1. Greeting
Card: Giving
someone an
audio CD as a
present?
Announce it in
this WordPad
document, from
which J.T. will
be able to
launch the
Windows 95
CD Player.







3. Customize:
To modify the
icon, right-click
on it, select
Object
Properties, and
then click on
the View tab.
Now click on
the Change Icon
button.



4. Where the Icons Are: Find an icon on your hard disk (look for ICOs or within EXEs or DLLs), and type an appropriate label for this 20th-birthday present.



**5. The OLE Connection:** Optionally, use Object Packager (right-click on the shortcut and select Package Object, Edit Package) to replace the icon and label.



6. Happy 20th: Stick the CD in J.T.'s drive, and put this memo on his screen. Imagine his surprise when he double-clicks on Smiley!

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But pop-up menus are not iust for email

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"Needs more discussion." "Let's meet on this." "No. No. No." Log Off Mail

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## Windows 95

MICROSOFT'S RESOURCE KIT

## **Installation and Setup**

ne of the most valuable reference materials for Windows users is the *Windows 95 Resource Kit.* This book is available from Microsoft Press for \$49.95, and an electronic version is available on the CD-ROM version of Windows 95. The *Windows 95 Resource Kit* is the definitive source for information that's not available in the

standard online Help. This is where the professionals go to find obscure features that improve a system's performance just so. This is the Bible all computer magazines and book publishers rely on. There are no bells and whistles, no literary references, no proce. Just the facts. This is what Tim Allen would call a Power Tool (and then make those ape sounds).

We're making portions of it available to you, starting with the obvious—setting up Windows 95 on your system—and moving on to more advanced topics. If you haven't installed Windows 95 on your system yet, read the first chapter, "Windows 95 Setup" to be sure that you're armed with all the information you need for smooth sailing.

Please note that there are several references to other sections of the Windows 98 Resource Kit that do not appear here. If you have the CD-ROM or invest in the book, you'll have access to those chapters.

This information appears here essentially as it does in the Windows 95 Resource Kit, with minor edits necessary for the magazine format.—YL

#### Windows 95 Setup

This chapter presents requirements for installing Windows 95, providing an overview of the types of Windows 95 installations available and presenting a step-by-step description of how to run Windows 95 expt to install Windows 95 on the local hard disk of a single computer.

Important: Before running Windows 95 Setup, read the SETUP.TXT file on the Windows 95 CD or Disk 1 of the floppy disks for information about hardware and software that might already be installed on your computer.

This section provides a brief summary of the installation steps in Windows 95 Setup, plus an overview of the new features in Windows 95 Setup, This information is designed to provide a fundamental description of Setup for administrators who are responsible for installing Windows 95 on many computers. However, the information provided here will also help individuals who are installing Windows 95 on the local hard disk of their PCs.

Note: In the Windows 95 Resource Kit, "local computer" refers to a PC with Windows 95 system files installed on the local hard disk; a local computer running Windows 95 may or may not be configured for a network.

The term "shared installation" is used to refer to a computer that runs a shared copy of Windows 95 from a network server, with few or no Windows 95 files installed on the local workstation.

#### Quick Start for Windows 95 Setup The following are the basic tasks you perform when installing Windows 95 on a computer for the first time:

 Check that the computer's hardware is supported and meets the minimum requirements for Windows 95. Close all applications and disable unnecessary TSRs. Check and defragment the hard drive, and back up key files. These tasks are described in "Before Starting Windows 95 Setup."

Start Windows 95 Setup.

3. How you start Setup depends on whether you are running Setup from floppy disks, CD-ROM, or a shared network directory. For more information, see "Starting Windows 95 Setup," page 376.

4. Choose the directory where you want the Windows 95 system files to be installed on the computer. If you want to preserve your existing Windows and MS-DOS operating systems, you must install Windows 95 in a new directory, as described in "Gathering Information."

"Gathering Information."
5. Choose the type of setup: Typical,
Compact, Portable, or Custom. For
most users, Microsoft recommends the
Typical Serup, which installs standard
options with default settings. For information, see "Deciding to Use Typical,
Portable, Commact, or Custom Setup."

Provide identification information about your user name, computer name, and other identifiers. See "Providing User Information and Specifying Computer Identification."

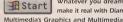
7. If you choose Custom Setup, you must specify the options you want to install and make other choices about the system components; including networking. For more information, see "Selecting Software Components in Selecting Network Components in Custom Setup" and "Changing Computer Settings in Custom Setup."

8. Create a startup disk for emergency recovery, as prompted by Windows 95 Setup. This is a highly recommended step. For information, see "Creating a Startup Disk." Restart the computer after Setup copies the required files. Then, depending on the type of installation, select the local time zone and complete other tasks for configuring

Continued on page 362 SEPTEMBER 1995



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## Windows 95 MICROSOFT'S RESOURCE KIT Installation and Setup

Continued from page 358

certain devices and software. For information, see "Copying Files and Completing Setup." Setup automatically guides you through each of these tasks and provides Help for any step if you need it before proceeding.

#### Installation Requirements

There are requirements for running Windows 95 Setup in addition to the requirements for installing and running Windows 95 on a computer. This section lists the following kinds of requirements:

Windows 95 Setup memory, disk space, and user information requirements.
 Windows 95 hardware, disk space, partition, and other requirements.

Operating System Requirements You must install the retail version of Windows 95 as an upgrade over an existing operating system. You can install Windows 95 over a number of different operating systems, including MS-DOS, Windows, and Windows 16 Workgroups. Windows 16 Cost of Novell DIX-DOS (or Novell DOS), PC-DOS, and OS/2, and as a dual-boot operating system with Windows NTI.

The minimum operating system software required to install Windows 95 is any of the following:

- MS-DOS version 4.01 or higher, or equivalent OEM versions; can also be installed under MS-DOS version 3.2 or higher with 35MB to 45MB of free space available on a single partition.
- Windows 3.x.
- Windows for Workgroups 3.1x.
- Dual-boot OS/2 (with MS-DOS).
   Dual-boot Windows NT (with MS-

Installing Windows 95 over DOS Windows 95 Setup attempts to install Windows 95 on a computer with an operating system version equivalent to MS-DOS 3.2 only if that version can exceed the 32MB partition limit (such as Compaq Version 3.31) because the operational disk space requirements for Windows 95 can exceed the 32MB partition limitation. The computer must have MS-DOS version 3.2 or later. Because there are many variations of MS-DOS 3.2, Microsoft recommends that you upgrade to Windows 95 from MS-DOS version 5.0 or later. To check the MS-DOS version, type ver at the command prompt. For information about how Windows

95 Setup treats disk partitions created under other operating systems, see "Partition Requirements," below. For information about how Windows 95 Setup deals with the boot sector and installs files for dual-boot operation with other operating systems, see "Setup Technical Discussion,"

Memory and Hard Disk Requirements
Usually, you need to supply very little
information during the Windows 95
Setup for a successful Windows 95 installation. The unique information required
for a typical installation consists only of
the following (which can be predefined in
a custom setup script): user name, and
computer and workgroup names, if the
computer is connected to the network.

Windows 95 Setup needs at least 417K of conventional memory to run. The amount of disk space required for Windows 95 Setup varies due to the types of hardware on the computer, required drivers, and optional components installed.

Approximate disk space requirements for a typical Windows 95 installation are 40MB for a new installation, 30MB for a Windows 3.1 upgrade, and 20MB for a Windows for Workgroups upgrade.

System Requirements The following information describes the basic hardware requirements for running Windows 95 from the hard disk of a local computers Windows 95 is designed for computers that use Intel x86-based processors; it canot be installed on any other processor. Windows 95 does not have symmetric multiprocessing (SMP) support and, therefore, cannot take advantage of multiple processors (as Windows NT does). For information about requirements for shared installations, see "Server-Based Setup," "page 380.

Computer 386DX, 20MHz or higher processor. To install Windows 95 to run from a local hard disk, a high-density floppy disk drive and hard disk drive are required. To install Windows 95 as a shared installation, the computer does ont need a hard disk of floppy disk drive. You cannot install Windows 95 on a 386 computer that has a B-step processor (that is, with ID 0303).

Peripheral Mouse or equivalent pointing device.

Memory Minimum 4MB of RAM, 8MB recommended. Eight megabytes are required to use Microsoft Exchange and the Microsoft Network, or to run multiple Win32-based applications.

Video Display VGA (minimum); Super

Disk Space 20MB of free hard-disk space is required for a local installation. For information about requirements for a shared installation, see "Server-Based Setup," page 380. A custom installation requires a minimum of 19MB. A compact installation requires 10MB of disk space. You also need a certain amount of free disk space for a swap file, depending on how much RAM the computer has As a guideline, you need at least 14MB of memory, which can be divided between RAM and hard disk space. For example, if the computer has 4MB of RAM, you need at least 10MB of free disk space for a swap file. If the computer has 16MB of memory, you will need very little disk space for a swap file.

Optional Modem, CD-ROM drive, network adapter, sound card, other multimedia hardware components.

Compressed Disks If you have disk compression software installed, the required amount of uncompressed disk space on the host drive before installing Windows 95 depends on several factors:

The type of compression used (Microsoft DriveSpace or DoubleSpace, Sace Electronics Stacker, and so on).

The available free space on other drives.
The existence of a permanent swap file (if any), and its location.

• The amount of available free space on other drives. If the computer does not already have a swap file, you might have to resize the host drive to accommodate the swap file requirements. For more information, consult your compression software documentation; see also "Disks and File Systems."

Partition Requirements Windows 95 Setup cannot install Windows 95 sunless a file allocation table (FAT) partition exists on the hard disk. It cannot install Windows 95 on a computer that has only high-performance file system (HTPS) partitions. Windows NT file system (NTPS) partitions, Windows 95 Setup reads most partitioning schemes and writes to the master boot record, unless disk partitioning schemes from other vendors are used.

The following information describes how Windows 95 Setup handles different types of disk partitions. For more

Continued on page 368 SEPTEMBER 1995

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## Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 362 information, consult the documentation

for the related operating system. MS-DOS (Fdisk and other vendors' partitioning software); Windows 95 Setup recognizes and begins installation over existing MS-DOS FAT partitions, if the partition is large enough to accommodate Windows 95 files (including swap files). Windows 95 supports MS-DOS Fdisk partitions on removable media drives such as Iomega's Bernoulli Box drives. Windows 95 recognizes and translates disk partitioning schemes created by other vendors' partitioning software, including Disk Manager DMDRVR.BIN and Storage Dimensions SpeedStor SSTOR.SYS.

Windows NT Windows 95 can't recognize information on an NTPS partition on the local computer. Windows 95 can be installed on Windows NT multiple-boot systems if enough disk space is available on a file allocation table (FAT) partition. On a Windows NT multiple-boot systems, Windows 95 Setup can install Windows 95 on an FAT partition with MS-DOS and, optionally, Windows 3x; or your must partition and format free space on the hard disk in a FAT partition, then perform a new installation onto the FAT partition,

OS/2 You must run Windows 95 Setup from MS-DOS. If it's not already present on the computer, you must first install MS-DOS and configure the computer for dual-booting with OS/2.

Windows 95 works with disk compression drivers, including the following: Microsoft DriveSpace and DoubleSpace, Stacker versions 3.0 and 4.x, and AddStor SuperStor. If you use other disk compression software, see the Windows README file or contact your product support resentative to determine compatibility.

#### Options for

#### Windows 95 Installations

As either an individual user or a network administrator, you can choose from various options for Windows 95 installations:

• Run Windows 95 Setup from MS-DOS or Windows 3.x.

- Install a typical, compact, or custom version on a desktop computer, or install Windows 95 for a portable computer.
   Install Windows 95 system files local-
- Install Windows 95 system files locally or run a shared copy from a server.
- Create customized and automated installations.

• Use Windows 95 features to maintain or update an installation.

These options are described in the following sections.

Setting Up from DOS or Windows Windows 95 Setup is a protected-mode, 16-bit, Windows-based application. There are two different scenarios in which Windows 95 Setup can be run:

Within Windows 3.1 or Windows for

Workgroups 3.1x.

• From MS-DOS at the command prompt (not the MS-DOS prompt under Windows).

The preferred method for running Windows 95 stup is from within Windows 3.1 or Windows for Workgroups. Run Windows 95 Setup from a DOS prompt when neither Windows 3.1 nor Windows for Workgroups is installed on the computer, but MS-DOS, PC-DOS, OS/2, Windows NT, or Windows 3.0 are installed.

Setup detects whether Windows 3.1 or any version of Windows for Workgroups is installed on the computer, and, · if it finds one of them, offers to install Windows 95 in the same directory in order to upgrade the existing installation. If you choose to install in the same directory, Windows 95 Setup moves the configuration settings in SYSTEM.INI, WIN.INI, and PROTOCOL.INI, plus file associations from the Windows 3.x Registry into the Windows 95 Registry, so all applications and networking settings will work automatically in the new Windows 95 environment. Also, Windows 3.x Program Manager groups are converted to directories in the PROGRAMS directory, so that they can be displayed on the Windows 95 Start menu.

Note: You must choose to install Windows 95 into a new directory fin custom setup) if you want to preserve the existing MS-DOS or Windows installation. You may have to reinstall some of your Windows-based applications before they can function properly in the new environment.

Dual-boot capabilities are not enabled by default. For information about installing Windows 95 on computers with other operating systems, and for information about configuring dual-boot options, see "Setup Technical Discussion."

#### Four Configuration Options

In Windows 95 Setup, you can choose from several types of installation option. The choice you make dictates the size of the Windows 95 installation on the computer (and, of course, the number of features installed). You can always go back and add or remove features in the future, if you wish.

Typical The default option recommended for most users with desktop computers. Performs most installation steps automatically for a standard Windows 95 installation with minimal user action. You need to confirm only the directory where Windows 95 files are to be installed, provide user and computer identification information, and specify whether to create a startup disk

Compact The option for users who have extremely limited disk space. Installs the minimum files required to run the operating system itself.

Portable The recommended option for mobile users who have portable computers. Installs the appropriate set of files for a portable computer. This includes installing Briefcase for file synchronization and the supporting software for direct cable connections to exchange files.

Custom The option for users who want to select application and network components to be installed, and confirm the configuration settings for devices. Installs the appropriate files based on user selections. This type of Setup is recommended for experienced users or power users who want to control various elements of Windows 95 Setup.

Note: For custom setup, the options selected by default are the same as for a Typical installation

#### Local Hard Disk or Shared Installation?

Windows 95 can run on the local hard disk of a computer or as a shared copy on the server for network workstations. Windows 95 files are distributed in the following three forms for installation on

Continued on page 372 SEPTEMBER 1995



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## Windows 95 MICROSOFT'S RESOURCE KIT Installation and Setup

Continued from page 368

computers that already have other operating systems in place: Windows 3.0 (or higher) upgrade on CD-ROM, Windows 3.0 (or higher) upgrade on 3.5-inch highdensity disks, or the MS-DOS upgrade on 3.5-inch high-density disks.

Depending on the license agreement at your site, you can also copy the Windows 95 source files to a shared network directory. Users can connect to this directory and run Windows 95 Setup. You can also configure servers to support installing and running shared installations of Windows 95 in one of the following three ways:

- On a computer with a local hard disk, with system files stored on and running from the server.
- On a computer with only a floppy disk drive, with system files stored on and running from the server.
- From a Novell NetWare server to support diskless workstations that are configured to remotely boot from a startup disk image on the server.

In these cases, most or all of the Windows 95 program files reside on the server instead of the workstation. For information, see "Server-Based Setup," page 380.

#### Customized or Automated Setup? You can choose any combination of methods for configuring custom versions of Windows 95:

- Create custom-setup scripts based on the MSBATCH.INF format. These scripts contain predefined settings for all Setup options, and they can contain instructions for installing additional software.
- Define WRKGRP.INI files to control users' choices for workgroups to join on the network.
- Enable user profiles and create system policies to specify and maintain the system configuration.

You can use setup scripts to create an automated mandatory installation scheme for installing Windows 95 on multiple computers from Windows 95 source files on servers. The following methods are possible:

- Use a login script to run Setup from a custom-setup script, automatically installing Windows 95 when each user logs on.
- Use Microsoft Systems Management Server to run Windows 95 Setup with a custom-setup script as a mandatory action.

• Use network management software from another vendor to install Windows 95 automatically based on custom-setup scripts.

Before Starting Windows 95 Setup Consider the following questions before proceeding with Windows 95 Setup on an individual computer:

Is the Hardware Supported? Check the Windows 95 README file and SETUP.TXT on the installation disks for any notes related to your computer hardware. If any specific computer component is not supported, Windows 95 selects a generic driver or uses the existing driver installed on the computer. If you install support manually for a hardware component that doesn't appear in the installation dialog boxes, select the model that your hardware can emulate or that is of the closest type. (All supported hardware components are listed when you run the Add New Hardware wizard, as described in Devices. However, be sure to specify that you don't want Windows to search your system for new hardware.)

Do the Computer Components Meet the Minimum Requirements? Read the Installation Requirements, and check your computer hardware and software components. Verify that all components meet the minimum requirements.

Are All Unnecessary TSRs and Timeout Features Disabled? Disable all TSRs and device drivers loaded in CONFIG.SYS or AUTOEXEC.BAT (or in any batch files called from AUTOEXEC.BAT), except those required for partition or hard disk control, network drivers, or any driver required for operation of a device such as video, CD-ROM, and so on.

Some portable computers (such as IBM's ThinkPad) automatically suspend operation after a specified time-out interval, or when the cover is closed. You should disable this feature while Windows 95 Setup is running.

Is the Installation Drive Checked and Defragmented? Windows 95 Setup automatically runs SeanDisk to check the integrity of the drive where Windows 95 is to be installed. However, you might want to check and defragment the hard disk before beginning Setup, using your usual defragmentation software.

Be sure to defragment all compressed drives, because a highly fragmented compressed drive reports more available disk space than is available. If you use disk compression software other than DriveSpace or DoubleSpace, be sure to run the disk-checking utility provided with your compression software. For information, see the documentation provided with the compression software.

Tip: When you run Windows 95 Setup, ScanDisk performs a quick check of the hard disk. You can skip this quick check (for example, if the computer uses disk compression software from another vendor) by using the /ig or /is switch with the setup command, as described in Using Setup Command-Line Switches, If you choose to skip automatically running ScanDisk, be sure to use another utility (as recommended by the vendor) to check the integrity of the hard disk before running Setup.

Are All Key System Files Backed Up? Any time you upgrade an operating system, backing up critical business or personal data is a prudent precaution. The files you should back up before installing Windows 95 include the following:

- All initialization (.INI) files in the Windows directory.
   All Registry data (.DAT) files in the
- All Registry data (.DAT) files in the Windows directory.
- All password (.PWL) files in the Windows directory.
- All Program Manager group (.GRP) files in the Windows directory.
- All critical real-mode drivers specified in CONFIG.SYS and AUTOEXEC.BAT.
   CONFIG.SYS and AUTOEXEC.BAT in the
- CONFIG.SYS and AUTOEXEC.BAT in the root directory.
- Proprietary network configuration files and login scripts.

Does the Networking Software Work Correctly? Make sure that the network software is running correctly before you start Windows 95 Setrup. Windows 95 uses the settings from the existing network configuration to set up the new configuration. Check the Windows 95 README file for additional notes related to your networking software.

> Continued on page 376 SEPTEMBER 1995

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## Windows 95 MICROSOFT'S RESOURCE KIT Installation and Setup

Continued from page 372

#### Starting Windows 95 Setup

The Windows 95 Setup program (SETUP.EXE) is found on the Windows 95 installation disks, or it can be stored on a shared network resource. For information about the installation media, see "Options for Windows 95 Installations," page 368.

This section describes methods for starting Windows 95 Setup on computers that will run Windows 95 from the local hard disk after installation. For information about setting up a computer to run a shared copy of Windows 95, see "Server-Based Setup," page 380.

Caution: Except for TSRs required for partition or hard disk control, network drivers, or device drivers such as CD-ROM, no TSRs or Windowsbased applications should be running when you start Windows 95 Setup. Close any such applications before continuing with Setup.

#### To start Setup from Windows 3.x:

 Start your computer in the usual way, and run Windows.

- 2. If you are installing Windows 95 from loopy disks, insert Disk I in the drive and make that the active drive in File Manager. Or, if you are installing Windows 95 from CD-ROM, put the CD in the drive and make that the active drive. Or, if you are installing Windows 95 from source files on a network server, connect to that server and switch to the shared network directory that contains the Windows 95 sucre files.
- Double-click on SETUP.EXE in the directory of the Windows 95 installation files. Or, From the File menu, choose Run, and then type setup and press Enter.
- Follow the on-screen instructions, as described in the following sections of this chapter.

#### To start Windows 95 Setup from MS-DOS or PC-DOS:

 Start your computer in the usual way.
 If you are installing Windows 95 from floppy disks, insert Disk 1 in the drive and make that the active drive. For example, type a: if the disk is in the A: drive. Or, if you are installing Windows 95 from CD-ROM, put the CD in the drive and make that the active drive. Or, if you are installing Windows 95 from source files on a network server, connect to that server and switch to the shared network directory that contains the Windows 95 source files.

- At the command prompt, type setup, and then press Enter.
- Follow the on-screen instructions, as described in the following sections of this chapter.

## To Start Setup from a Network Computer Using a Setup Script:

- Log on to the network, running the existing network client.
   Connect to the server that contains
  - the Windows 95 distribution files.

    3. At the command prompt, run Windows 95 Setup by specifying the batch file that contains the setup script, using

this syntax: setup msbatch.inf
For example, type setup \intserver
\text{\text{\text{lwin95}mybatch.inf}} to run Setup using a
setup script named MYBATCH.INF that is
stored in the WIN95 directory on a server named NTSERVER. For more information, see "Custom, Automated, and
Push Installations."

Note: If Windows 95 is installed from a server, the location of that network directory is stored in the Registry. When you add a device or require additional support files to run Windows 95. Setup automatically attempts to retrieve the files from that same location on the server. This eliminates the need to maintain a permanent network connection on the computer and makes it easier to modify the configuration of a computer in a networked en window.

#### Using Command-Line Switches with Setup

Windows 95 Setup provides options to control the installation process. These options, or switches, are specified on the command line as arguments for the setup command (such as setup /d). Similar to MS-DOS command arguments, the specific option is preceded by a forward slash (/) character (not the backslash character, which is used to specify directory arguments). Setup can be run with the setup command using the following switches:

Provides help for syntax and use of

setup command-line switches.

• /C Instructs Windows 95 Setup not to

- load the SmartDrive disk cache.

   /d Instructs Windows 95 Setup not to use the existing version of Windows for the early phases of Setup. Use this switch
- take the early phases of Setup. Use this switch if you have problems starting Setup that might be due to missing or damaged supporting files for Windows.

  ### Instructs Windows 95 Setup not to
- Ad Instructs Windows 95 Setup not to check for the minimum disk space required to install Windows 95.
- /ih Runs ScanDisk in the foreground so that you can see the results. Use this switch if the system stalls during the ScanDisk check or if an error results.
- /iL Loads the Logitech mouse driver.
   Use this option if you have a Logitech Series C mouse.
- /iq Instructs Windows 95 Setup not to perform the ScanDisk quick check when running Setup from MS-DOS. You probably want to use this switch if you use compression software other than Drive-Space or DoubleSpace.
- i/is Instructs Windows 95 Setup not to run the ScanDisk quick check when starting Setup from Windows. You probably want to use this switch if you use compression software other than DriveSpace or DoubleSpace.
- Instantial Instructs Windows 95 Setup to copy a minimal installation of the required Windows 3.x DLLs used by Windows 95 Setup, and then to exit to MS-DOS without installing Windows 95.
- script, filename Instructs Windows 95
   Setup to use settings in the specified script to install Windows 95 automatically; for example, setup MSBATCH.INFspecifies that Setup should use the settings in MSBATCH.INF. For more information, see "Custom, Automated, and Push Installations."

 /t:tempdir Specifies the directory where Setup is to copy its temporary files. This directory must already exist, but any existing files in the directory will be deleted.

Tip: Users who require accessibility aids with Windows might find it difficult to install Windows 95 in the usual way because accessibility aids cannot run with Windows 95

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## Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 376

Setup. To solve this problem. users for their system administrator) can provide setup answers in a setup script, which is a text file that is created before running Setup. Then the user can run Setup from the command prompt using this setup script. Windows 95 Setup will run without requiring additional user input. For more information, see "Custom. Automated and Push Installations "

#### Selecting Network Components

This option is available only when you select Custom Setup, Windows 95 Setup lets you specify network components and settings. This section summarizes the options for modifying network settings during setup. For more information about network support, see "Introduction to Windows 95 Networking," in the Networking section, page 414.

Note: Windows 95 Setup provides appropriate settings based on hardware and network components running at the time you start Setup. For best results, accept the default settings unless you know that particular settings need to be

To remove a network component from the list of components to be installed, select the component you do not want to install in the Network Configuration screen, and then click on the Remove button.

#### To add a network component to the list of components to be installed:

- 1. In the Network Configuration screen, click on the Add button.
- 2. In the Select Network Component Type dialog box, select the type of component you want to add, and then

Note: If you're installing a real-mode (16-bit) network client from another vendor, the Adapter, Protocol, and

click on the Add button.

Service component types are not available.

- 3. In the dialog box for the selected component type, select the manufacturer of the component in the Manufacturers list. and then click on the appropriate version in the list of models. Click on OK.
- 4. To configure or view settings for the component you just added, click on the component, and then click on the Properties button.

Important: If your computer is connected to a Windows NT domain, be sure to configure Client for Microsoft Networks to specify the correct domain for log-on validation. This ensures that you can log on to your preferred domain and your network printer selections are available automatically.

If you do not specify a domain name when you are installing Windows 95 from source files on the network, Setup might not be able to access required files for completing the final stages of installation.

#### Server-Based Setup

This chapter provides information about the Server-based Setup program, which is used to install Windows 95 source files on a server and to prepare for installing Windows 95 to run as a shared copy on client computers.

Server-based Setup (NETSETUP.EXE) is used to prepare the server to run Windows 95 Setup (SETUP.EXE) on network client computers. Windows 95 provides improved support over Windows 3x for installing and running a shared copy of Windows 95 (that is, "shared installations"). After installing Windows 95 source files on a server, Server-based Setup can be used to create and manage machine directories, which contain the specific configuration information for each computer on a shared installation. You can also use Server-based Setup to create setup scripts (which are batch files for automated setup), as described in "Custom, Automated, and Push Installations," Windows 95 supports the following kinds of shared installations: · Computers that start from the local

hard disk and then run a shared copy of

Windows 95 from the server.

· Computers that start locally from a floppy disk and then run a shared copy of Windows 95 from the server.

· Diskless workstations that remotely boot (sometimes called RIPL or remote IPL) from servers and run a shared copy of Windows 95.

At the time of the release of Windows 95, the remote-boot option can be used only for diskless workstations on Novell NetWare version 3.x and 4.0 networks. Support for remote boot of Windows 95 workstations will be available in upcoming releases of Windows NT. For information about Windows NT support, contact your sales support representative.

Server-based Setup replaces the Administrative Setup process used for Windows 3.x and Windows for Workgroups. The following methods for creating network-based setup and shared installations compares the actions required on older versions of Windows to the Windows 95 methods:

Windows for Workgroups Run setup /a to create a Windows distribution directory on the network

Windows 95 Run Server-based Setup under Windows 95 (netsetup). Windows for Workgroups Customize

INF files for system; desktop, applications, and Program Manager.

Windows 95 Create a setup script in MSBATCH.INF format.

Windows for Workgroups For shared installations, create network directories and configure shared files.

Windows 95 Included automatically as part of Server-based Setup.

Windows for Workgroups For shared installations, create correct configuration files and startup disks for each workstation to define settings for MS-DOS, Windows, and networking software.

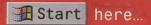
Windows 95 Included automatically as part of the setup script and Windows 95 Setup.

Windows for Workgroups Run setup /n on each workstation

Windows 95 Run Windows 95 Setup with setup script (setup msbatch.inf). When you use Server-based Setup to

create shared installations for computers that start from floppy disk or for remoteboot workstations that use a disk image on a server, you need to run Setup only once for each type of computer. Server-based Continued on page 384

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## Windows 95 MICROSOFT'S RESOURCE KIT Installation and Setup

Continued from page 380

Setup can create machine directories for the other similar computers. So you only have to make copies of the startup disk (either the floppy disk or the boot image).

Therefore, for example, for shared installations of Windows for Workgroups on remote-boot workstations, users simply restart their workstations to upgrade to Windows 95. For upgrading shared installations that start from floppy disks, users can upgrade by simply restarting their computers with the new startun disk.

The Issues The Server-based Setup program is available only on the Windows 95 CD in the ADMININETTOOLS.
NETSETUP directory. Server-based Setup is not provided on the Windows 95 flop-my distribution disks.

Important: Server-based Setup can be run only from a computer running Windows 95. You cannot run Server-based Setup from Windows 3.1, Windows for Workgroups, Windows NT, or MS-DOS.

Typically, shared installations are used where there might be users who need to access various computers for tasks such as point-of-sale data entry. Shared installations are also typically used on enterprise networks with many thousands of similar computers.

The most important consideration in deciding how to run Windows 95 in the corporate environment is the current configuration for workstations running Windows 3.x. If the largest portion of workstations currently run shared Windows, then the upgrade process is straightforward if you continue to use a shared configuration. If you decide to change a workstation to run Windows 95 from the local hard disk, applications must be reinstalled and desktop settings reconfigured in addition to installing the new operating system.

The basic benefits of installing Windows 95 on the local hard disk of a computer include the following:

- Performance is superior.
- Less network traffic is generated.
- The system can start and continue running if the server is not available.
- Users have more freedom to customize the system, if system policies don't restrict this.

The benefits of a shared installation include the following:

- Little or no hard disk space is required on the local computer.
- Updating drivers for multiple computers is easier and less time consuming.
- The workstation is more secure and operation is safer for novice users, because network log-on is required and access to system files is limited (although you can use system policies to enforce the same restrictions for local installations).

Although an entirely shared configuration makes it easy to maintain the system, a shared configuration also means more network traffic and requires larger servers.

The following sections provide some guidelines and summary information for planning the installation process for computers that will run a shared copy of Windows 95. This information supplements that planning and implementation information presented in the "Deployment Planning Guide."

Planning for Machine Directories

For a shared installation on each computer that starts from a floppy disk or a remote-boot disk image, the machine directory is a required network directory that contains the particular files required for that specific configuration. The machine directory contains WIN.COM, the full Registry, and startup configuration files such as 59 STEM.NIO.

Both Windows 95 Setup and Serverbased Setup can create machine directories automatically, as described in Task 2: Creating Machine Directories. For shared installations for floppy disk-based and remote-boot workstations, you need to run Windows 95 Setup only once for each type of configuration. Then use Severbased Setup to create machine directories for other computers. You can replicate the startup disks (or boot images) for other computers of the same type.

For computers that start from the hard disk, machine directories are optional. However, you must run Windows 95 Setup on each computer that has a hard disk, even if the computer will use a machine directory on the network.

The machine directory is for computer-specific settings. This is different from the individual user directories on Windows NT networks or the individual Mail directories on NetWare networks,

which contain user-specific files such as login scripts or user profiles for individual users. Using machine directories offers several benefits:

 Computer-specific settings are saved in a central location, rather than with user-specific settings, so the correct configuration is available for the particular computer no matter which user logs on.

 A single boot image on the network (or single version of the floppy startup disk) can be used to start several computers.

 The administrator can easily create and replicate shared Windows 95 installations for new computers from a central location, often without having to run Windows 95 Setup repeatedly.

Windows 95 files for a shared installation are stored in the locations described below.

Startup Disk Contains the real-mode software necessary to start the computer and connect to the shared Windows directory, including the mini Registry used to start the computer. The startup disk for a shared installation can be a local hard disk, all loppy disk, or a remote-boot disk image stored on a server.

Machine Directory Contains files specific to a particular computer (not a particular user), including the full Registry. This also includes the default USER.DAT file, which is updated with the user's personal USER.DAT if user profiles are enabled on the network. The machine directory can exist on any shared network resource. Machine directories must exist on the network for computers that start from a floppy disk or for renuceboot workstations, and are created locally by default for shared installations on computers that have hard disks.

Shared Windows 95 Directory on a Server Contains all the shared Windows 95 files. This directory is marked readonly automatically during installation of the source files.

Planning for Shared Installations This section lists a few technical issues related to shared installations of Win-

dows 95.

Technical Issues for All Network Clients on Shared Installations Network log-on is required before running Windows 95 on shared installations, because network connectivity is required before Windows 95 can run across the network.

> Continued on page 388 SEPTEMBER 1995





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## Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 384

This can be a generic log-on, rather than specific user log-on. For more information about this, see "Configuring Shared Installations."

- One Windows 95 software license is required for each computer that will run Windows 95.
- Because most or all of the Windows 95 files are located on the server for shared installations, loading the shared components increases network traffic.
- Each client computer must use either all 32-bit, protected-mode networking components or all 16-bit, real-mode components, not a combination of realmode and protected-mode components.

Important: After Windows 95 installation is complete, all path statements in login scripts must specify Windows 95 locations, and not Windows 3.x or MS-DOS. Make sure that path variables are set correctly in login scripts to avoid unexpected behavior.

Technical Issues for Microsoft Protected-mode Clients These issues are important in your planning for shared installations that use Microsoft Client for NetWare Networks or Client for Microsoft Networks:

- Each client computer must use all 32bit, protected-mode networking components. For example, a computer running a shared installation cannot run a network client such as Microsoft Client for NetWare Networks using ODI network adapter drivers.
- Real-mode components are required for the first connection to the network during system startup. Microsoft TCPI/IP in Windows 95 runs only in protected mode, so the computer must load an IPX/SPX or NetBEUI protocol to make the real-mode connection to the network. After the system loads and switches to protected mode, then Microsoft TCP/IP can be used. Realmode versions of NetBEUI and IPX/SPX-compatible protocols are built into the real-mode software that is used to make the first connection to the server before Windows 95 starts.
- You cannot use existing NDIS 2.x or ODI drivers to support protected-mode networking clients. For either Client for

NetWare Networks or Client for Microsoft Networks, the network adapter must have an NDIS 3.1 driver (although an NDIS 2 driver is used for the first connection to the server during system startup).

• For protected-mode network clients, you cannot use a PCI network adapter or ISA adapters on a PCI computer for system startup over the network. This is because PCI adapters do not start until the second booting of Windows 95. For shared installations, the adapter must start on the first boot.

Note: If a computer has an IBM 16/4 token-ring adapter and has been using ODI drivers, Windows 95 Setup uses the existing ODI driver by default. To use this adapter with a 32bit, protected-mode network client remove the existing ODI driver and replace it with the Windows 95 NDIS 3.1 driver. For information about the specific statements for installing the NDIS 3.1 driver for this adapter as part of a setup script, see MSBATCH.INF Parameters.

Technical Issues for Other Network Clients Client computers can run a shared copy of Windows 95 from a server using real-mode network software other than the Microsoft real-mode networking software used for system startup. However, computers that don't use the Microsoft real-mode network software for system startup cannot use proceed—mode network clients (such as Client for Microsoft Networks or Client for Microsoft Networks or Client for NetWare Detworks).

Shared Installation Requirements Server-based Setup operates on one server at a time. You specify a particular server where Windows 95 files are to be installed and where related machine directories will be created for shared installations. However, the machine directories do not need to be created on the same server where the Windows 95 files are installed. In fact, to balance the network load, you might prefer to designate specific servers to maintain the Windows 95 source files, and other servers to contain the Windows 95 source files, and other servers to contain the machine directories and login

scripts. Typically, you need to make Windows 95 source files available from multiple servers, both to provide fault tolerance and to reduce network traffic.

About Swap File By default, the swap file for a shared installation is stored in the machine directory. For floppy-disk and remote-boot computers, this means that all paging occurs across the network. If computers configured for floppy-disk or remote-boot startup hard disks, you will see noticeable performance improvements as the swap file is placed on the hard disk.

To change the location for the swap file, add the entry pagingfile= c.win386.swp in the [386Enh] section of the SYSTEM.NI file stored in the machine directory. You can add this setting automatically using an [Install] section in the setup script, as described in MSBATCH.NIF Parameters.

The swap file size requirements vary, depending on the amount of RAM in the client computer, the number and kinds of applications that are run, and other factors. For guidelines on swap file size, see "Performance Tunine."

#### Installing Windows 95 For Shared Installations

Each computer that starts from a hard must run Windows 95 Setup. For remote-boot workstations or floppy disk-based computers, run Windows 95 Setup once for each class of computers—that is, workstations that have identical network dadpter configurations. Similar computers can then use their own machine directories with the startup floppy disk or boot image to run Windows 95.

The setup script tells Windows 95 Setup what kind of installation is allowed, based on the installation policy specified in Server-based Setup. The script can force a local hard-disk installation or a shared installation, or allow either. If the script is set to allow either, Setup asks the user to specify a shared or local installation.

Note: Windows 95 can be installed for remote-boot workstations only by specifying RPLSetup=1 in the [Network] section of a setup script.

For shared installations, you can use the default version of MSBATCH.INF stored on the server plus a list of computer names

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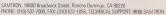






























### Windows 95 MICROSOFT'S RESOURCE KIT Installation and Setup

and machine directories to generate a setup script for each client computer. You can also create custom setup scripts using the MSBATCH.INF format. You can also archive setup scripts, in case you need to run Setup again for a particular computer (for example, if the Registry is corrupted and cannot be restored).

The appropriate setup script is specified as a command-line parameter when running Windows 95 Setup. As described in "Custom, Automated, and Push Installations," you can use the following basic approaches to install Windows 95 with setup scripts:

 Run Windows 95 Setup with a setup script from the command line; for example; setup n:\bob\bob.inf.

Use a login script that includes a command line to run Setup with a setup script, automatically installing Windows 95 when the user logs on.

 Use Microsoft Systems Management Server or network management software from other vendors to run Windows 95 Setup with a setup script.

When Windows 95 Setup runs with a setup script, Setup performs the following for both local hard-disk and shared installations:

 Detects and configures the hardware, storing the configuration in the computer's machine directory.

 Prompts the user to specify or change any settings that are not defined in the setup script.

For shared installations, the following additional installation tasks are performed:

• If DisplayWorkstationSetup=1 is spec-

 If Display WorkstationSetup=1 is specified in the setup script, Setup prompts the user for the path to the machine directory, if a path isn't specified in the setup script.

 Setup creates the startup disk (or boot image), as described in "Configuring Shared Installations."

 If a protected-mode network client is to be used, Setup configures the system for making the transition from realmode networking.

Technical Notes for Shared Installations For shared installations, the first access to the network must occur in real mode. For shared installations that use a Windows 95 protected-mode network client, Microsoft real-mode networking (NET.EXE) is used for the first network connection, even for connecting to a Net-Ware network. After Windows 95 is loaded, the protected-mode drivers take over if the computer is configured to use a Microsoft protected-mode client such as Client for NetWare Networks.

Real-mode versions of NetBEUI and the IPX/SPX-compatible protocols are built into NET.ER. Real-mode networking includes only the basic redirector, there is no support for mailslots or named pipes. Microsoft TCP/IP cannot be used until after the system loads and switches to protected mode.

The following briefly summarizes the software portion of the startup process for a computer that starts from a floppy or hard disk to run a shared copy of Windows 95 from a server. For a more general description of the Windows 95 startup process, see "Setup Technical Discussion."

 10.SYS starts and reads the Registry to determine whether the computer is running Windows 95 over the network.

 COMMAND.COM runs AUTOEXEC.BAT and NETSTART.BAT (if present), which starts the network.

starts the network.

During the first real-mode network connection, the system asks for a user name and password, and then logs on the user. If the administrator configures AUTOEXEC.BAT for log-on using a generic user name, the user is not prompted to type a name and password.

The network connects to the shared Windows directory. For computers running Windows 95 protected-mode network clients with machine directories on the network, the network also connects to MACHINES.INI.

. IO.SYS starts Windows.

• If the computer is configured to run a Windows 95 protected-mode network client, the system completes the transition to protected-mode networking.

Because there is both a real-mode and protected-mode network log-on, it is possible that the user will be prompted for log-on information twice. To avoid this, you can configure the net log-on statement in AUTOEXEC.BAT to use a generic user name, so that the user isn't prompted to enter information for the real-mode log-on. To do this, use a statement in this format: net logos generic, name password ky

The following descriptions cover some configuration issues and hints related to the real-mode and protectedmode network log-on:  For Windows NT networks, you can make sure that the generic log-on in real mode uses the same domain as the user's actual log-on in protected mode. This

avoids the connection problem altogether.
For NetWare networks, if Client for
NetWare Networks is configured to use
the same preferred server as specified in the
real-mode log-on, Windows 95 automatically tries the same user name and password for protected-mode log-on. If this is
successful, the user will not see a second
rooms for protected-mode log-on.

Notice in all cases that for shared installations, if you make the user name and password the same for real-mode and protected-mode network log-on and for Windows log-on, the real-mode log-on roomst always appears.

MS-DOS Mode is Disabled When the user starts a program that runs in MS-DOS Mode, Windows 95 shuts down and uses real-mode MS-DOS to run the program. When the program quits, Windows 95 starts again. This mode is available as a last resort mode for compatibility with existing software. Computers that run a shared version of Windows 95 lose their network when Windows 95 shuts down. Because of the related problems, MS-DOS Mode is not available for computers running Windows 95 over the network. When a user tries to run a program in this mode, Windows 95 warns that the mode has been disabled.

Hed Docking for Network Adapters is Not Supported When Windows 95 saurs over the network, real-mode drivers control the network adapter. If the network adapter is a Plug-and-Play acred, the driver is responsible for setting the card to the acrive state. (Use the setup program provided with the card to do this,) Computers on the network do not support hot Plug-and-Play disconnects, because the operating system is on the network.

Users Cannot Log Off and Log On as a Different User For another user to log on to a shared installation, the computer must be shut down and restarted.

Safe Mode Startup Always Runs Configuration Files To perform a Safe Mode system startup for a shared installation, the network must be started, so 10.5VS always runs AUTOEXEC.BAT, CONPIG.SVS, and NETSTART.BAT. Information in the machine directory controls how and when to perform a Safe Mode startup.



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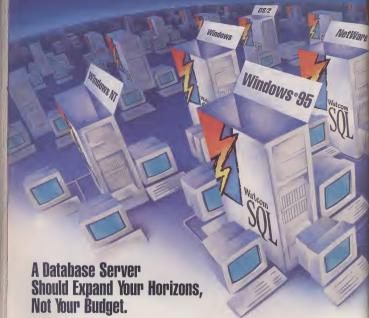
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# The Registry

If you like going under the virtual hood, nothing beats the rush of hacking the Windows 95 Registry, that all-purpose system librarian and administrator that has cheerfully taken over where the old INI files left off. The problem is, the Registry is too cryptic, even for seasoned Windows 3.x users. The following section explains the

different components that make up the Registry, and shows you how you can edit it. Or at least snoop around.—YL

#### Overview

This chapter presents background information about the structure of the Registry, and how values from Windows 3.x. IN files are stored in the Registry. Notice, however, that no descriptions of individual Registry entries are provided, because such details are beyond the scope of the Windows 95 Resource Kit.

Caution: Whenever possible, use Control Panel or System Policy Editor to ensure values are stored properly in the Registry if you change the configuration. If you use Registry Editor to change values, you will not be warned if any entry is incorrect.

The Windows 95 Registry provides a unified database for storing system and application configuration data in a hierarchical form. Because the Registry contains all settings required to configure memory, hardware peripherals, and Windows 95-supplied network components, you may find that it is no longer necessary to configure settings in startup configuration and initialization files. Also, because settings are stored centrally, you can easily provide both local and remote support for system configuration.

The Registry is roughly analogous to the INI files used under Windows 3.x, with each key in the Registry similar to a bracketed heading in an INI file, and with Registry values similar to entries under the INI headings. However, Registry keys can contain subkeys, while INI files do not support nested headings. Registry values can also consist of binary data, rather than the simple strings used in INI files.

Although Microsoft discourages using Ni files in favor of Registry entries, some applications garticularly 16-bit Windowsbased applications graticularly 16-bit Windowsbased applications still use IN files. Windows 95 supports INI files soldy for compatibility with those applications and related tools (such as setup programs). The AUTOEVEG.BAT and CONFIG.SYS files also still exist for compatibility with real-mode system components and to allow users to change certain default system settings such as the PATH environment variable. New Win32-based applications can store their initialization information in the Registry.

The Registry provides the following

- benefits in Windows 95:

   A single source provides data for enumerating and configuring the hardware, applications, device drivers, and operating system control parameters. The configuration information can be recovered easily in the event of system failure.
- Users and administrators can configure computer options by using standard Control Panel tools and other administrative tools, reducing the likelihood of syntactic errors in configuration information.
- A set of network-independent functions can be used to set and query configuration information, allowing system administrators to examine configuration data on remote networked computers.
- The operating system automatically

backs up the last good configuration used to start the computer.

Because user-specific Registry information can be maintained on a central network server when user profiles are enabled, users can access personal-desktop and network-access preferences when logging on to any computer, and settings for multiple users can be maintained on a single computer. Also, system policies can be used to enforce certain Registry settings for individuals, workgroups, or all users. For more information, see "User Profiles and System Policies."

#### How Windows 95

Components Use the Registry

With Windows 95, the operating system stores and checks the configuration information in the Registry for most configuration settings during system startup.

Whenever you run Setup, use the Add New Hardware option in Control Panel, or run other setup programs for hardware. The Configuration Manager places hardware configuration data in the Registry. This information includes a list of hardware detected in the computer:

- When you install Windows 95 in the same directory as an earlier version of Windows, your previous desktop settings are moved from INI files to the Registry.
   When you reconfigure the desktop, the settings are added to the Registry.
- Each time you add or remove a Plugand-Play-compliant device, configuration data is added to the Registry. For example, new information is added when you install a PC Card modem.
- Device drivers send and receive load parameters and configuration data from the Registry. This is similar to settings defined under MS-DOS by device= lines in CONFIG.SYS.
- System policies, user profiles, and administrative tools such as the Control Panel can be used to add or modify configuration data. Registry Editor can be used to view and occasionally change the system configuration.



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### Windows 95 MICROSOFT'S RESOURCE KIT The Registry

A set of Registry APIs can make information available through remote procedure calls (RPCs) to Windows 95 management tools from other vendors. This permits administrators to view and modify configuration information remotely for hardware and software components that store information in the Registry. Notice that the Registry APIs are accessible remotely using named pipes (client-side only), NetBIOS over NetBEUI, Windows Sockets on IPX, and Windows Sockets on IPX, and Windows Sockets on IPX.

#### Getting Started with the Registry Editor

To get the most out of the material in this chapter, you should run Registry. Editor while you are reading so that you are see the contents of the Registry Editor while your system. By default, Registry Editor does not appear in any menu or on the desktop. Notice, also, that Registry Editor (REGEDIT.EXE) is automatically copied to the Windows directory when Windows 95 is installed from a C.D. Registry Editor is not available with the Windows 95 floopy disks. To run Registry Editor, other following:

 From the Start menu, click on Run and type regedit.

• To find specific data in the Registry, double-click on any folder icon in the Registry Editor window for a Registry Editor window for a Registry Editor window for a Registry Coy, from the Edit menu, elick on Find. Then type all or part of the text string you want to find, and elick on options to specify whether you want to find a key name, entry name, or data. After Registry Editor finds the first instance of the text string, proses Fd to search for the next instance.

Registry Editor can be used to view or on another computer or on another computer over a network. Both the administrator's computer and the remote computer require the Microsoft Remote Registry service to allow remote Registry access. For more information about installing and taking advantage of the Microsoft Remote Registry service, see "Remote Administration."

Tip: The network administrator can restrict users from being able to use Registry Editor to modify the Registry by setting a system policy named Disable

Registry Editing Tools. Notice, however, that this policy does not prevent the administrator or another user from modifying the Registry by using System Policy Editor. For more information about this restriction and using System Policy Editor to modify the Registry on individual or multiple computers, see "User Profiles and System Policies."

#### Registry Structure

Registry Editor displays the contents of the Registry database in six subtrees. The hierarchical structure that appears in Registry Editor is similar to the way Windows Explorer displays hierarchical directory structures.

This section describes the hierarchical organization of the Registry and defines the overall structure of keys and value entries. The actual contents or location of a specific Registry subkey may differ from what is described here, depending on the services and software installed. However, this description of the general organization will help you understand how to navigate the Registry.

Registry Hierarchy The Registry structure represents database information specific to the computer and to individual users. The computer-specific information includes settings for hardware and software installed on the computer. The userspecific information includes settings in user profiles, software preferences, and personal printer and network settings.

In the Registry, each individual key can contain data tiens called studie entries, and can also hold additional subkeys, with keys roughly analogous to directories, and value entries analogous to files. Each root key name begins with "Elkey," to indicate to software developers that the key is a unique identifier, called a handle, that can be used by a program to access resources.

The following list briefly describes the Registry subtrees:

Hkey\_Local\_Machine This key contains computer-specific information about the type of hardware installed, software settings, and other information. This information applies to all users who log on to this computer.

 Hkey\_Current\_Config This key points to

a branch of Hkey\_Local\_Machine\Config

that contains information about the current configuration of hardware attached to the computer.

• Hiep, Don, Data This key points to a branch of Hiey, Local, Machine that contains the dynamic status information for various devices as part of the Plug-and-Play information. This information may change as devices are added to or removed from the computer. The information for each device includes the related hardware key and the device's current status, including problems.

 Htey\_Classes\_Rort This key points to a describes certain software settings. This key displays the same data as it did in Windows 31, which is essential information about OLE and association mappings to support drag-and-drop operations. Windows 95 shortcuts (which are, in fact, OLE links), and core aspects of the Windows 95 user juterface.

• Heey Users This key contains information about all the users who log on to the computer, including both generic and user-specific information. The generic settings are available to all users who log on to the computer. The information is made up of default settings for applications, desktop configurations, and so on. This key contains subkeys for each user that logs on to this computer.

 Hkey\_Current\_User This key points to a branch of Hkey\_Users for the user who is currently logged on.

Value Entries in the Registry Keys Registry Editor displays data in two panes. The value entries in the right pane are associated with the selected key in the left pane.

A value entry has three parts: the data type (which appears as an icon), the name, and the value itself. A value entry cannot be larger than about 64K. The limit to total Registry size depends on available hard disk space.

#### Note: Keys are folders under My Computer labeled with the prefix HKEY\_. Subkeys are folders nested within keys.

Following are the data types currently used by the system:

 Icons with ones and zeros represent binary data. Most hardware component information is stored as binary data, and can be displayed in the Registry Editor Continued on page 404

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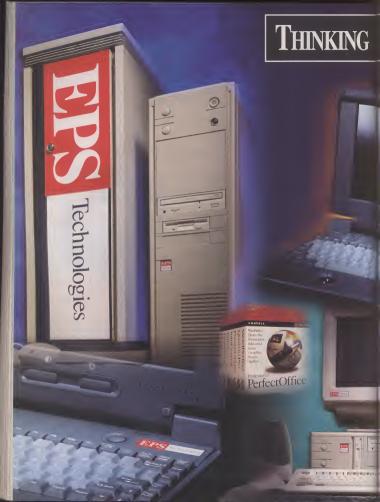
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# Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 400

in binary or hexadecimal format. For example, Int 13: 01.

• Icons with ab in them stand for a sequence of characters representing human-readable text.

Registry Files The Registry is logically one data store, but it physically consists of two files to allow maximum flexibility for network configurations:

 User-specific information is contained in USER.DAT. The information in this file is reflected in user profiles.

 Hardware-specific and computerspecific data is contained in SYSTEM.DAT. This information is reflected in hardware profiles and in the settings displayed in Device Manager.

By default, USER.DAT and SYSTEM.
DAT are stored in the Windows SYSTEM subdirectory, but these two files can be located in physically different locations.
For example, if user profiles are enabled, SYSTEM.DAT can be stored on the local hard disk and USER.DAT stored in each user's log-on directory on the network, allowing rowing users to maintain the same desktop preferences wherever they log onto the network. For shared installations, these files are stored in the machine directory.

Recovering Registry Data In Windows 95, data is written to the Registry only when a flush occurs—that is, when something happens after changed data has aged more than a few seconds or when an application intentionally flushes the data to the hard disk.

Each time Windows 95 starts, it backs up the Registry by copying the current SYSTEM.DAT and USER.DAT files to SYSTEM.DAT and USER.DAO, respectively. If Windows 95 fails to start, the backed-up Registry from the last successful startup can be copied over the current Registry. This method recovers the last successful settings after a system failure.

Saving and Restoring the Registry. The Registry can be exported, imported, or recreated using either the Windows-based version of Registry Editor or the real-mode version on the Windows 95 emergency startup disk. By using the export capabilities of Registry Editor, a specific branch or the entire Registry can be saved in text format as a REG file. A branch of or the entire Registry can be restored by importing a REG file that was created by exporting the Registry can be

To export or import Registry files, use the Export and Import commands from the Registry menu.

In rare circumstances when the Registry is badly corrupted, you can start the computer using the Windows 95 startup disk. Then you can use the real-mode REGEDIT.EX utility on the startup disk to import a REG file. In this case, the following command syntax can be used at the command prompt.

regedit [/L:system] [/R:user] file1.reg, file1a.reg... regedit (/L:system) [/R:user] /e file3.reg

[regkey] regedit [/L:system] (/R:user) /c file2.reg

Translated, the command syntax means the following:

• /L:system Specifies the location of SYS-

USER.DAT.

• file1.reg Specifies one or more REG files

to import into the Registry.

• /e file3.reg Specifies the filename to which the Registry should be exported.

which the Registry should be exported.

• regkey Optionally, specifies the starting
Registry key from which to export a portion of the Registry. If no value is specified,
regedit /e exports the entire Registry.

• /c file2.reg Specifies the REG file to use

 /c file2.reg Specifies the REG file to use to replace the entire contents of the Registry.

Caution: Use regedit /c with extreme care, and only when you are sure that the specified REG file contains a complete image of the Registry. Also, the Resource Kit does not provide sufficient information to guide you through the process of editing an REG file, so it is recommended that you undertake editing an REG file only under the guidance of a product support representative.

#### The Registry Keys in Detail

The Hey\_Local Machine key contains the configuration data for the local computer. The information in this database is used by applications, device drivers, and Windows 95 to determine configuration data for the local computer, regardless of which user is logged on and what software is in use.

Hardware devices can place information in the Registry automatically using the Plug-and-Play interface. Software for installing device drivers can place information in the Registry by writing to standard APIs. Users can place information about hardware in the Registry using the Add New Hardware option and other options in Control Panel, or using Device Manager, as described in "Devices." Here Local Machine contrains several

subkeys, as listed briefly in the following list. The rest of this section provides details about the first four of these keys.

• Config A collection of configurations

- Config A collection of configurations for the local computer.
- Enum Information about hardware devices on the system.
- Software The computer-specific information about software installed on the local computer, along with miscellaneous configuration data.
- System The database that controls system startup, device driver loading, Windows 95 services, and operating system behavior.
- Hardware Information about serial ports and modems used with the Hyper-Terminal program.
- Network Network information created when a user logs on to a networked computer, including the user name, primary network provider, whether the log-on was validated by a server, and information about the system policies processor.
- Security Information about the network security provider and remote administration capabilities.

Now let's look at these in more detail. The Config Subtree The Hwy, Local. MachinelConfig subtree contains information about alternate hardware configurations for the computer. For example, it can contain information about multiple configurations to be used when the computer is connected to a network, when it is undocked from a docking station, and so on. Each alternate configuration is assigned a unique identifier, and this configuration ID has a subkey under the Config key. Each configuration appears in the list of hardware profiles in the System option in Control Panel.

When Windows 95 checks the hardware configuration at system startup, one of three things occurs:

 In most situations, the configuration ID is mapped to a unique configuration, an artist or a

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## Windows 95 WINDOWS RESOURCE KIT The Registry

and Windows 95 selects the appropriate one automatically. The settings for the related Config subkey are used for system configuration.

 If the user is starting the computer for the first time with new hardware components, Windows 95 creates a new configuration ID, and a new Config subkey is added to the Registry.

 If the configuration ID is mapped to more than one configuration, the user is prompted to choose a configuration.

The Enum Subtree Bus enumerators are responsible for building the hardware tree. This includes assigning an identification code to each device on its bus arreivenig its configuration information, either directly from the device of from the Registry. For more information, see "Introduction to System Configuration" and "Windows 95 Architecture."

Bus enumeration information is stored in the Hkey\_Local\_Machine/Enum subtree. For all types of devices, subkeys contain information such as device type, assigned drive letter, hardware ID, and device manufacturer, plus driver-related information for network components.

The Software Subtree The subtree Hely\_Local\_Machine\Software contains configuration information about all installed software that can write information in the Registry. The entries in this key apply to anyone using this particular computer, and include definitions for file associations and OLE information.

The Hkey\_Local\_Machine\Software subtree contains several subkeys, including the Classes subkey, plus description subkeys for all installed software that can write to the Registry, as described in the following sections.

The System Subtree The data in Hkey\_Local\_Machine\System is organized into control sets that contain a complete set of parameters for device drivers and services that can be loaded with Windows 95.

All data that controls startup is described in the CurentControls stubree under Hey\_Local\_Machine(System\_This control set has two parts: the Control key and the Services key. The Control key contains information used to control systems attrup, including the computer's network name and the subsystems to start. The Services key contains information to control the loading and configuration of drivers, file systems, and so on. The data

in the Services key also controls how these services call each other.

Hkey\_Users and HKey\_Current User Hkey\_Users contains the Default subkey plus all previously loaded user profiles for users who have logged on. The information in the Default subkey is used to create the user profile for a user who logs on without a personal user profile. The \_Default subkey contains keys for AppEvents, Control Panel, Keyboard layouts, Network, RumMRU, and Software. amone others.

Hkey\_Current\_User contains the database with the user profile of the user who is currently logged on. A user profile ensures that the user interface and operation of Windows 95 will be the same on any computer when that user logs on, if that person's profile is available at that computer.

Hkey\_Current\_User contains all the information necessary to set up a particular user environment on the computer, such as application preferences, seren colors, and security access permissions. Many of these settings are the same kind of information that was stored in WIN.INI under Windows 3.x. Hkey\_Current\_User includes several subkeys, some of which are described in the following list:

AppEvents Subkeys containing the path and filename of the system sound file that plays when specific system events occur.
 Control Panel Subkeys containing Control Panel settings, including information stored in WIN.INI and CONTROL .INI under Windows 3.x.

Keyboard Layouts A value entry defining the current active keyboard layout, which should be set by using the Keyboard option in Control Panel.
 Network Subkeys describing persistent

and recent network connections.

• RunMRU Subkeys listing the most

 RunMRU Subkeys listing the mos recently used applications.

 Software Subkeys describing the current user's software settings, using the same structure as Hkey\_Local\_Machine\Software and containing application-specific information stored in WIN.INI or private initialization files under Windows 3.x.

 StreamMRU Subkeys for the most recently used documents.

Whenever similar data exists in Hkey\_Local\_Machine and Hkey\_Current\_ User, the data in Hkey\_Current\_User takes precedence. For example, settings for applications and the desktop defined by

the current user take precedence over default settings.

Hkey\_Current\_Config and Hkey Dyn\_Data The Hkey\_Current\_Config points to the current system configuration in the collection of configurations stored in Hkey\_Local Machine\Config.

Some information in Windows 95 must be stored in RAM because it requires fast modification and retrieval that cannot wait for the Registry to flush to the hard disk. All this data can be found under Hkey Dwn Data.

The Heep\_Dyn\_Detailconfiguration Manages subkey, sometimes referred to as the hardware tree, is a record in RAM of the current system configuration. The information is drawn from devices currently installed and loaded (or those that failed loading). The hardware tree is created every time the system starts and updated whenever a change occurs to the system configuration. The information that appears in Registry Editor is given when this key is displayed, so if s never out of displayed never neve

Hkey\_Dyn\_Data also contains statistics gathered for various network components in the system. These reside under Hkey Dyn Data/PerfStats.

VxDs from other vendors can provide dynamic data to this area, too.

#### About INI Files and the Registry

Although the Registry replaces the basic function of the initialization files used in earlier versions of Windows, the SYS-TEM.INI, WINNI, and WINFILE.BIN files still appear in the Windows directory. These files continue to be used for compatibility with earlier Windows-based applications and device drivers. For example, entries in WIN.INI and SYS-TEM.INI created by Win16-based applications are not updated in the Registry, because such applications do not know to access the Windows 95 Registry.

If you install Windows 95 as an upgrade over Windows 3.1, some INI file settings are copied into the Registry, including settings from CONTROL.INI, PROGMAN.INI, SYSTEM.INI, and WIN.INI.

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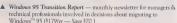
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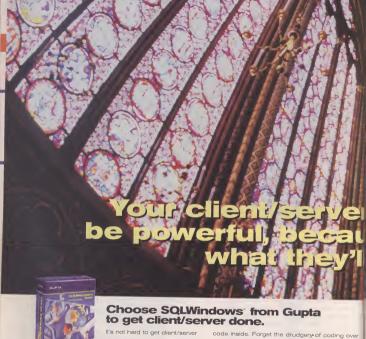


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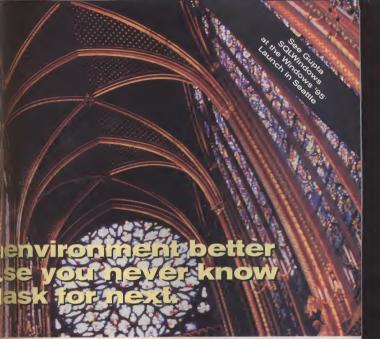
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# **Networking**

indows 3.1 was notoriously difficult to configure for networks. Windows for Workgroups 3.11 was a marked improvement in that area, but not quite as easy and intuitive as Windows 95. Now you can easily set up a peer-to-peer network for data- and resource-sharing, or add your Windows 95 system to a NetWare LAN as a client.

Add to the mix Direct Cable Connection, which creates a quasi-network, and Dial-Up Networking, which lets you set up any system as a dial-up server that you can call from anywhere (or use it to access the Internet), and your connectivity level will soar to new heights.—YL

#### Introduction to Windows 95 Networking

The Windows 95 operating system includes built-in networking support with a wide range of improvements over earlier versions of Windows. This includes built-in support for popular networks, plus an open, extensible networking architecture.

For supported networks other than Microsoft networking, the computer must already have the networking software from another vendor installed. Windows 95 Setup adds only the client or protocols required to work with Windows 95.

The following networks are supported:

• Artisoft's LANtastic Version 5.0 and later.

- Banyan's VINES Version 5.52 and later.
  Digital Equipment Corp.'s Pathworks
- installed as a protocol.

   Microsoft networking—Microsoft
- LAN Manager, Windows for Workgroups 3.x, and Windows NT. • Novell NetWare Version 3.11 and later.
- SunSoft's PC-NFS Version 5.0 and later.

The built-in networking components include support for a wide range of network transports (such as TCP/IP and IPX/SPX), industry-wide communications protocols (such as RPC, NetBIOS, and named pipes), and existing network

device standards (such as NDIS and ODI), Because of the extensible architecture, other network vendors can add network connectivity enhancements and application support, and you can mix and match components at every layer. For information, see "Windows 95 Network Architecture."

Following is a summary of the benefits of networking features in Windows 95:

Robust Networking Components Using No Conventional Memory The protectedmode clients provided with Windows 95— Microsoft Client for NetWare Networks and Client for Microsoft Networks—use only 32-bit, protected-mode protocols, drivers, and supporting files. On large block transfers over the network, these protected-mode clients are up to twice as fast as real-mode clients under Windows 3.x. Windows 95 includes new 23-bit drivers for network protocols and adapters, plus a new implementation of TCP/IP.

Easy, Graphical Configuration for All networks Networking Components All network clients, adapter drivers, protocols, and services are installed and configured by using the Network option in the Control Panel rather than by editing configuration files manually. All configuration values for protected-mode components are stored in the Registry.

Automatic Setup of Windows 95 on Network Workstations For both Windows- and MS-DOS-based computers, Setup upgrades the network software whenever possible to a Windows 95 protected-mode client and supporting protected-mode components, based on information discovered about existing networking components. Setup also supports automated installation and customization during installation from setup scripts, plus installing Windows 95 to run from a local hard disk or from a shared network copy. For information, see "Server-Based Setup," page 380, and "Custom, Automated, and Plush Installations"

Peer Resource Sharing with Protectedmode Network Clients Any computer running the protected-mode Microsoft Client for NetWare Networks or Client for Microsoft Networks can be set up to serve as a file and print server for other computers on the network. Resources can be protected with user-level Security on NetWare or Windows NT networks using existing user account databases. On Microsoft networks, resources can also be protected with share-level security.

Simultaneous Connection to Multiple Networks on a Computer The number of network connections allowed on a computer running Windows 95 depends only on the limits of your networking software. (Windows 3.x supported connection to only one network. Windows for Workgroups 3.11 allowed simultaneous connection to only two networks.) For information, see "Windows 95 Network Architecture."

Plug-and-Play Networking Support You can insert or remove a PC Card network adapter while the computer is running, and Windows 95 will assign the required resources automatically and make or remove the network connection. For any network adapter that uses an NDIS 3.1 driver, you can remove a docking unit without turning off the computer. If you disconnect the network cable from a computer running Windows 95 with Plug-and-Play components, the system continues to function. With most real-mode network clients, this causes the system to stall. For more information, see "Overview of Plugand-Play Networking," page 424.

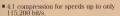
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### Windows 95 Microsoft's Resource Kit

can use the Windows 95 unified user logon and password caching to log on to Windows NT, Novell NetWare, and other networks. Automatic log-in script processing is provided for Microsoft and NetWare networks. Users can access network resources by using Network Neighborhood or common dialog boxes, such as the Open or Save As dialog boxes. For more information, see "Log-on-Browsine, and Resource Sharine."

Automatic Reconnection for Lost Server Connections When servers are available again after the loss of a network connection, Windows 95 reconnects automatically and rebuilds the user's environment, including connection status, drive mappings, and printer connections.

Client-side Caching of Network Data with Protected-mode Clients A protectedmode network client is a file system driver that uses the same 32-bit cache (VCACHE) used by all Windows 95 file system drivers, so it can cache network data for quick access. Files read across the network are copied to the RAM cache and made available to applications much faster than they would by rereading the file across the network. For a given file request, the cache is checked for the needed data before checking the network. This feature is available when running Client for NetWare Networks or Client for Microsoft Networks. For more information, see "Disks and File Systems."

Long Filenames for Network Resources Computers running Windows 95 can recognize and use long filenames on other computers running Windows 95, Windows 91.5 windows 91.5 windows 91.5 windows 91.5 windows 91.5 windows 91.5 severs, and NetWare 3.x and 4.x volumes that have been configured to use the OS/2 name space. For more information, see "Disks and file Swstems."

Support for the Win32 WinNet Interface This is an application pregram interface (API) that lets developers create applications that run unmodified on different networks. The Win32 WinNet interface in Windows 95 supports 16- and 32-bit applications (as opposed to the WinNet interface in Windows 3x, which supports only 16-bit applications). For more information, see "Windows 95 Network Architecture."

User Profiles and System Policies for Automatic Configuration To take advantage of system policies, the computer must be running a protected-mode network client such as Microsoft Client for Net-Ware Networks or Client for Microsoft Networks. For more information, see "User Profiles and System Policies."

Agents for Network Backup and Remote Management Windows 95 includes backup agents for Chevenne Software's ARCserve and Arcada's Backup Exec. Agents for Simple Network Management Protocol (SNMP) and Microsoft Network Monitor are available in the ADMININETTOOLS directory of the Windows 95 CD, When the correct system management agent is installed on client computers, you can use a service such as Hewlett-Packard's Open View or Microsoft's Systems Management Server to manage workstations remotely. For more information about remote administration, see "Remote Administration."

Dial-up Networking for Remote Access Windows 95 supports multiple protocols for remote access, including TCP/IP, IPX/SPX, and the industry standard Point-to-Point Protocol (PPP). For more information about remote access protocols and connection types, see "Dial-Up Networking and Mobile Computing."

#### The Issues

If the real-mode network is running when you eatar Windows 95 Setup, the appropriate network client is installed automatically. This is the recommended method for installing networking support in all cases. When Setup detects existing network components, it installs the appropriate supporting software automatically and moves the configuration settings to the Registry, whenever possible

If Windows 95 Setup detects that Net-Ware networking components are present, it installs the new protected-mode client, Microsoft Client for NetWare Networks, plus the supporting protectedmode protocol and adapter drivers. Client for NetWare Networks is not installed automatically, however, if Setup detects virtual loadable module (VLM) running with NetWare Directory Services (NDS) support. To maintain the existing realmode client and support configuration, you must run Setup in Custom mode and manually select the NetWare client. For more information, see "Windows 95 on NetWare Networks."

Microsoft recommends using the 32-bit, protected-mode networking components whenever possible. With protected-mode networking components, all configuration settings are stored in the Registry, so you do not have to maintain configuration files such as AUTOEXEC.BAT, PROTOCOL JUNIOR OF THE TER

The protected-mode networking components also allow you to take advantage of the many related benefits, such as:

- . Performance and reliability.
- · Peer resource sharing capabilities.
- Use of system policies for administrative control, remote administration of the Registry, and use of the network agents, such as Network Monitor and Remote Registry service, available in the ADMINNETTOOLS directory on the Windows 95 CD.

If you must run a real-mode client, networking settings are required in AUTOEX-EC.BAT, plus a NETSTART.BAT file might be required to start the network during system startup. Configuration settings are maintained in PROTOCOL.INI or a similar file, depending on the particular network.

#### **Network Configuration**

You can install and configure all networking options for Windows 95 automatically or manually during Windows 95 Setup. You can also install and configure networking support after installing Windows 95 by using the Network option in the Control Panel.

In the Network option, you can set properties for the following:

- Configuration of network clients,
- adapters, protocols, and services.

   Identification of the computer on the network.
- Access control, to specify the security used when other users access this computer over the network.

In the procedures presented in the following sections, it is assumed that Windows 95 and the appropriate networking hardware have already been installed on your computer. You might need to install or configure various supporting components, such as security, mobile networking components, agents for backup and remote administration software, and support for user profiles and system policies.

#### Installing Networking Components

The recommended method for installing networking components for Windows 95



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### Windows 95 Microsoft's Resource KIT

is to ensure that the existing real-mode networking components are running when you start Windows 95 Setup. In this case, Setup detects the existing components and installs corresponding support for Windows 95 automatically and, whenever possible, migrates configuration settings to the Registry. For more information about how to do this, see "Introduction to Windows 95 Setup."

This section summarizes how to install networking support by using the Net-work option in Control Panel after Windows 95 is installed. Specific issues for installing various network components are discussed in the other chapters in this part of Windows 95 Resource Kit. The following procedures describe the general steps that are required for installing networking components.

To install a driver for a new network adapter after Windows 95 is installed, run the Add New Hardware option in Control Panel, and be sure to answer Yes when asked whether Windows 95 should search for new hardware.

#### To install networking components after Windows 95 is installed:

In the Network option in Control
 Panel, click on the Configuration tab,
 and then click on Add.

2. In the Select Network Component Type dialog box, double-click on the type of component to install, as described in the following list.

Client Installs client software for the types of networks the computer is connected to. You can use either a 32-bit network client (which needs no real-mode components) or older real-mode networking clients. There is no limit to the number of 32-bit network clients you can have only you eral-mode network client is you can have only no real-mode network dient installed at a time. Some networks are supported only as primary networks. For more information, see "Windows 95 on Other Networks".

Adapter Installs drivers for the network adapters in the computer. However, the recommended method for installing a new adapter is to use the Add New Hardware option in Control Panel. You can configure the type of driver to use (such as enhanced-mode NDIS, readmode NDIS, or ODI); specify the resources for the adapters you are using (such as I/O, IRO, and transceiver tyrue):

and define other options for the adapter. For more information, see "Network Technical Discussion."

• Protocol Installs network protocols and sets related options. For more information, see "Network Technical Discussion."

 Service Installs peer file and printer sharing services and other types of network services, such as backup agents, additional print services, Microsoft Remote Registry, and Network Monitor. For more information, see "Remote Administration."

 In the Select dialog box, select the name of the component manufacturer in the Manufacturers list, and then select the specific component in the Models list.

Note: Some components require that you shut down and restart the computer after installing them

You can also install and configure networking components by using custom setup scripts or system policies. For more information, see "Custom, Automated, and Push Installations," and "User Profiles and System Policies."

#### Setting Computer Name and Workgroup

Windows 95 requires that you define a workgroup and computer name for each networked computer, independent of the type of networking software you use. This information is required if you install networking software during Windows 95 Setup. You can also change the computer name or workgroup later.

To specify the computer name, workgroup, and description for a computer: 1. In the Network option in Control

Panel, click the Identification tab.
2. Type the values for the computer identification settings as described in the following list.

• Computer Name The computer name must be unique on the network. It can be up to 15 characters long, with no blank spaces. The computer name can contain only alphanumeric characters, plus the following special characters:! @#\$%^

 Workgroup The workgroup name does not need to be unique, but it uses the same naming conventions as the computer name. For more information about using WRKGRP.INI to set administrative guidelines for specifying the workgroup that can be selected, see "Custom, Automated, and Push Installations"

 Computer Description This information is displayed as a comment next to the computer name when users are browsing the network.

#### Starting the Network During System Setup

If your computer uses 32-bit, protectedmode networking components exclusively, you do not need statements in AUTOEKE.BAT or other startup batch files to start the network when you start the computer. The installation of the correct protected-mode network client, protocol, and network adapter driver, as shown in the Network option in Control Panel, is all you need to ensure that networking is available whenever you start Windows 95.

If your computer uses any real-mode components for the client, protocol, or network adapter driver, then you must include commands to start the network in AUTOEKE. BAT or a batch file that is called from AUTOEKE. BAT. This is easiled from AUTOEKE. BAT. This is because real-mode components must be inserted properly in the startup sequence to be available to other parts of the system.

For real-mode components on Net-Ware networks, NET.CFG or a similar file is used to start and configure networking during system startup. The user or network administrator must maintain this file. For Microsoft networks, the net start statement in AUTOEXEC.BAT is used to start any realmode networking components. If this statement is required for any components, the operating system automatically places the net start statement at the beginning of AUTOEXEC.BAT. If you remove this statement, the system replaces it so that the real-mode networking component is available the next time the computer is started.

The PROTOCOL.INI file stores settings for real-mode networking components. The only sections that might be read are [PROTMANS], [neteard], and [NDISHLPS]. For more information about the content of PROTOCOL.INI, see "Windows 95 on Microsoft Networks."

Continued on page 424 SEPTEMBER 1995

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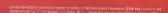
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# Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 418

Overview of

Plug-and-Play Networking

The networking components in Windows 95 are designed for dynamic Play-and-Play operation with most ISA, EISA, Peripheral Component Interconnect (PCD, IBM Micro Channel, and PC Card (PCMCIA) network adapters. To take advantage of these features, the computer must be running all protected-mode networking components, including client, protecols, and network adapter drivers.

NDIS 3.1 supports adding and removing Plug-and-Play network adapters dynamically while the computer is runing. If an event occurs such as undocking a portable computer, the Windows 95 protocols can termove themselves from memory automatically. However, the protocols must load information during system startup to be available. So when an event such as the dynamic addition of a PCI network adapter occurs, the operating system prompts you to restart the computer. If you are certain that the required protocol is already loaded, you can ignore this message.

Additional Plug-and-Play networking benefits are available when you use 32-bit sockets with PC Cards. You can click on the PCMCIA icon on the Taskbar to remove the card without shutting down Windows 95 or turning off the computer. Using the PCMCIA icon causes the operating system to perform an orderly shutdown. Windows 95 notifies applications that the network is no longer available and automatically unloads any related drivers or protocols.

To help mobile users who might need to change adapters in their hardware, Windows 95 uses 32-bit Card and Socket Services to support hot removal aniseration of PC Cards, including network adapters. Support for hot docking means that users do not have to restart their computers each time they make a change to the configuration.

Network Plug-and-Play support in Windows 95 includes application-level support. An application created for Windows 95 might be designed so that it can determine whether the network is available. In that case, if a network adapter is removed, for example, the application automatically puts itself into "offline" mode to allow the user to continue to work, or it shuts down

#### Basic Troubleshooting for Your Network

This section provides basic troubleshooting information for installing network components with Windows 95. For additional information about troubleshooting for particular networks, see the sections in Networking. For information about genal troubleshooting procedures and the supporting tools provided with Windows 95, see "General Troubleshooting"; for information about network problems, see online Help. When troubleshooting network problems, start by verifying the network operations status prior to and during the error condition.

To evaluate the network problem, check these factors:

 Did the network work before? If so, what has changed? If any hardware or software has been added or removed, reset the original network hardware or software, and try again.

If the network was provided by another vendor, was it installed previously and working? If not, reinstall the other vendor's network. Verify that the network operates correctly. Reinstall Windows 95.

Has any network cable been moved or added? Check cables, connections, and terminators.

 Have any protocols been added or removed? Check protocol settings, protocol bindings, and the compatibility of the protocol with the network.

Are the network adapter settings correct? Check network adapter settings.
 Consult the documentation for the correct settings.
 Reset the adapter settings to the correct values if necessary.
 Restart the computer and try again.

 Has any network adapter been moved or added? Check the adapter connection, and check any other working adapter.

Are the network connections live?
 Look at the stars lights on the back of the network adapter or on the media attachment, which was the start of the

Check Domain or Server Validation Verify that the network domain or server is validating the user account. If the log-on isn't validated, connections to required servers cannot be made, log-in scripts won't run, and so on. If the network domain or server doesn't validate the account, perform these procedures:

To check the log-on setting:

 In the Network option in Control Panel, double-click on the network client (for example, Client for NetWare Networks or Client for Microsoft Networks).

2. In General properties, do the following: For Client for Microsoft Networks, verify that log-on validation is enabled and that the correct domain name or preferred server is shown. For Client for NetWare Networks, verify that the correct server is specified as the Preferred Server.

To check the user and workgroup names, click on the Identification tab in the Network option in Control Panel. Check the computer name and workgroup name. Also check basic log-on requirements.

Check Connections to Network Resources Determine whether domains, workgroups, and workstations appear in Network Neighborhood. If they appear, try connecting to a server or workstation. If they do not appear, verify that at least one server exists on the local network and that client services and protocols are installed. Also, check eable termination.

If you cannot connect to the server or workstation you want, review the error messages. At the command prompt, use the net use command to verify that you can connect to at least one server and workstation. If you cannot connect to may server or workstation, then check workgroup assignment, domain assignment, domain log-on, and basic network operations.

If you still cannot connect, determine whether you can connect to the server from another computer. If this doesn't work, it probably indicates a problem with the server you are trying to connect to, or with the cabling or routing to that server.

Verify that the File and Primer Sharing service appears in the list of installed network components to ensure that peer resource sharing is enabled. Also verify that the correct settings for the browsing method are configured in the properties for the File and Primer Sharing service. For more information, see "Log-on, Browsing, and Resource Sharing,"

Check Network Adapter and Protocol Configuration The following procedure summarizes how to check settings for Continued on page 428

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file names.

Long File Names for Windows

(Ugh!)

with 8-character

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Sample Long File Name

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fax inc.tif

orachrt1.doc

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# Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 424

network adapters. For more information about configuring network adapters, or for detailed troubleshooting steps for protocols, see "Network Technical Discussion."

Note: If the network adapter is not terminated, Windows 95 stalls during system startup (similar to Windows for Workgroups 3.11). To test whether this is causing a computer to stall, try terminating the network adapter directly.

#### To check network adapter settings:

- In the Network option in Control Panel, double-click on the entry for the network adapter in the list of installed components.
- Click on the Advanced tab, and verify that each entry in the Property area has an appropriate value specified in the Value area. For more information, see your hardware documentation.
- Click on the Resources tab, and then verify that the configuration type, I/O address range, and IRQ are correct. Again, for more information, see your hardware documentation.
- Click on the Driver Type tab, and then verify that the appropriate driver type is selected. (If you are using a protectedmode network client, the default is an Enhanced Mode NDIS Driver.)
- Click on the Bindings tab, and verify that each protocol is checked. If a protocol is not checked, that protocol is not providing network functionality using that adapter.

Check Real-mode Network Components To check basic network communications, you can use the net diag command with a second computer connected to the same local network. As a diagnostic tool, net diag can assist you in troubleshooting network connectivity problems by establishing a diagnostic server and then verifying that the local computer can connect to this server.

#### To establish a diagnostic server on a second local computer:

At the command prompt, type: net diag
 When a message appears showing you
the protocols in use, press one of the
numbers indicated in the message to
specify the protocol to test.

When a message appears prompting you to specify whether a diagnostic server exists, press N.

To verify that the diagnostic server is

## detected in a Windows 95 VM: 1. On the computer that is not the diag-

- nostic server, at the command prompt, type: net diag. A message appears showing the protocols in use.

  2. To specify the protocol to test, type one of the numbers in the message for
- one of the numbers in the message for the protocol used on the diagnostic server. A message appears stating that the diagnostic server has been detected. To reinstall the protected-mode dri-

### vers in Windows 95: 1. In the Network option in Control Panel,

- make note of each installed component.

  2. For each component, click on the component, and then click on the Remove button.
- Install the components by following the procedure named "To install networking components after Windows 95 is installed," in "Installing Networking Components."

#### Peer Resource Sharing

When a computer is running File and Printer Sharing services, other users running a compatible network client can connect to shared printers, volumes, CD-ROM drives, and directories on that computer by using the standard techniques for connecting the network resources, as described in "Browsing on NetWare Networks" and in "Browsing on Microsoft Networks."

Using computers running Windows 95 as peer servers allows you to add secure storage space and printing to the network at a low cost. The peer service is based on a 32-bit, protected-mode architecture, which means all the Windows 95 benefits for robust, high performance are available. In addition. administrators can take advantage of features provided with Windows 95. such as Net Watcher and system policies, to centrally administer peer servers. In addition, user-level security is available as an additional enhancement beyond the peer server capabilities built into Windows for Workgroups.

**Tip:** Using Net Watcher, a network administrator can remotely monitor and manage

files on any computer running File and Printer Sharing services if remote administration has been enabled for that computer. Net Watcher lets an administrator disconnect users, change access rights, and administrator the file system on remote computers. For more information, see "Remote Administration."

Installing Peer Resource Sharing If you use custom setup scripes or choose the Custom option as the setup types of the Windows 95 Setup, you can specify that File and Printer Sharing services be installed with Windows 95. Otherwise, you can add the service later by using the Network option in Control Panel.

 If most of the users who need to share these resources are running NETX, VLM, or Client for NetWare Networks, then install File and Printer Sharing for NetWare Networks.

 If most users who need to share these resources are running Client for Microsoft Networks, Windows NT, Windows for Workgroups, or Workgroup Add-on for MS-DOS, then install File and Printer Sharing for Microsoft Networks.

### To install File and Printer Sharing after Setup:

- In the Network option in Control Panel, click on Add.
   In the Select Network Component Type
- dialog box, double-click on Service.

  3. In the Select Network Service dialog
- In the Select Network Service dialog box, click on Microsoft in the Manufacturers list. Then, in the Network Service list, click on the File and Printer Sharing service you want to install.

For more information about enabling File and Printer Sharing in custom setup scripts, see "Custom, Automated, and Push Installations." For more information about controlling peer resource sharing capabilities using system policies, see "User Profiles and System Policies."

Overview of Resource Sharing Security For File and Printer Sharing for Microsoft Networks (but not Net-Ware), Windows 95 supports sharelevel security similar to the security provided with Windows for Workgroups. This level of security associates a password with a shared disk directory

Continued on page 432 SEPTEMBER 1995



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# Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 428

or printer. Share-level security for peer resource sharing can be implemented in a Windows 95-only peer-to-peer network or on a network supported by Windows NT or other Microsoft Windows network-compatible servers.

For File and Printer Sharing services on both Windows NT and NetWare networks, Windows 95 supports user-level security by linking a peer server directly to another server for user account validation. For network administrators, the user account list is centrally controlled at the Windows NT domain controller or NetWare server; on a Windows NT network, the user account list on a single server can also be used for validation. The resources on the Windows 95 peer server can be accessed only by users with accounts in the central database. Users can also be assigned specified access rights for particular resources.

The 32-bit, protected mode network client and the File and Printer Sharing service are separate network processes, but they share connection information and pass requests to each other when validating a user-level security request.

For user-level security on a computer running either version of File and Printer Sharing service, specify the server that contains the database of user accounts that are allowed to connect to this peer resource sharing server.

You can do the following to customize access to a shared resource:

See Use the Windows 95 user interface to specify which users can access the shared resources, and which rights they have. For details, see "Controlling Access to Pere Server Resources on NetWare Networks."
For File and Printer Sharing on NetWare Networks, you can set up user rights remotely on the computer running Windows 95 with NetWare utilities like FILER.
For File and Printer Sharing on Microsoft Networks, you can set up user rights termotely by using User Manager for Windows NT.

 You can use Net Watcher to monitor, add, and remove shared resources, as described in Remote Administration.

When a user requests access to a shared resource under user-level security, Windows 95 checks for the user's log-on name against the list of user accounts maintained on the server. If this is a valid user log-on name, Windows 95 then checks whether

this user has access privileges for this resource. If the user has access privileges, then the requested operation is allowed.

File and Printer Sharing

Microsoft Networks File and Printer Sharing for Microsoft Networks is the 32-bit. protected-mode Windows 95 SMB server (VSERVER.VXD) that supports all Microsoft networking products that use the server message block (SMB) file-sharing protocol, including Windows for Workgroups, Windows NT, LAN Manager, LAN Manager for Unix, AT&T Starl AN, IBM LAN Server, 3Com 3+Open and 3+Share, and DEC Pathworks. Windows 95 enhances the features of Windows for Workgroups peer services by providing administrative control over whether peer sharing services are enabled, by adding user-based security features, and by supporting long filenames.

The following summarizes some requirements for File and Printer Sharing for Microsoft Networks:

ing for Microsoft Networks:

The computer must use Client for Microsoft Networks.

 File and Printer Sharing for Microsoft Networks cannot run at the same time as NCP-based File and Printer Sharing for NetWare Networks.

If user-level security is used, a Windows NT domain controller must be used for authentication.

The default settings for File and Printer Sharing are correct for most installations. You should need to change these settings only in the following circumstances:

 If you need to set Browse Master properties, as described in "Browsing on Microsoft Networks."

 If you want LAN Manager 2x clients on your network to use resources on a computer running File and Printer Sharing for Microsoft Networks.

Use the Network option in Control Panel to configure the Browse Master and LM Announce parameters for the File and Printer Sharing service. For information about configuring security in Access Control properties, see "Security."

To specify Browse Master settings:

 In the Network option in Control Panel, double-click on File and Printer Sharing for Microsoft Networks in the list of installed components.

In Advanced properties for File and Printer Sharing for Microsoft Networks, select Browse Master in the Property list.

3. Select an option in the Value list, as described in the following list.

• Automatic Specifies that this computer will maintain the browse list if Windows 95 determines that it is necessary. This is the default.

 Yes Specifies that this computer is to be used to maintain the browse list for computers in this workgroup.

 No Specifies that this computer is never used to maintain the browse list. Use this setting if the computer has little free memory or is connected by a slow link (such as a dial-up connection), or if other conditions create special performance problems.

At least one computer in the workgroup must have the value of Automatic or Yes for this parameter to ensure the browse list is available to network computers. This parameter is equivalent to the MaintainServerList- entry in the [Network] section of SYSTEM.INI in Windows for Workgroups, 3.11.

The LM Announce property controls whether a computer running File and Printer Sharing for Microsoft Networks can be seen by LAN Manager 2x clients.

To specify LM Announce settings:

1. In Advanced properties for File and

In Advanced properties for File and Printer Sharing for Microsoft Networks, select LM Announce in the Properties list.

Select an option in the Value list, as described in the following list.

Yes Specifies that you want this computer to announce its presence to other
Microsoft networking computers in the
workgroup, because there is a LAN
Manager Za. domain on the network.
This value must be set to Yes if computers in your workgroup need to see this
computer when browsing the network.

No Specifies that you do not want this
computer to broadcast its presence to
other computers. Setting this value to No
minimizes the level of network traffic.
Other tuers can still connect to this computer by specifying its UNC name in a
Map Network Drive dialog box, but the
computer will not appear in horsowe lists.

This parameter is the equivalent of the LMAnnounce—entry in the [Network] section of SYSTEM.INI in Windows for Workgroups 3.11. This value should be No unless there is a LAN Manager 2.x domain on your network.

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# Windows 95 MICROSOFT'S RESOURCE KIT

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A LAN Manager 2.x domain is recognized by browse servers in a workgroup only if at least one computer running Windows 95 (or Windows NT in the domain) is a member of that LAN Manager 2.x domain.

To make a computer running Windows 95 a member of a LAN Manager 2.x domain, set the workgroup name for the computer to be the same as the LAN Manager 2.x domain name.

You can share a directory (or other resource) by selecting it in Windows Explorer or in My Computer and then configuring the related options. The following procedure describes how to share a directory on a computer where user-level security has been specified in the Network option in Control Panel. The steps for sharing resources with share-level security are similar to those for user-level security accept that you do not select specific users. Rather, specify the type of access and define a password for the shared resource.

To share a directory (folder) with userlevel security:

- In Windows Explorer, right-click on the icon for the directory you want to share. In the context menu that appears, click on Sharing.
- Click on the Sharing tab, and then type a share name for the directory.

Tip: If you add a dollar sign (\$) to the end of the share name, the resource will not appear in Network Neighborhood.

 Click on the Add button, and use the Add Users dialog box to specify which users can access the directory.

NetWare Networks If you want to use File and Printer Sharing for NetWare Networks, make sure of the following:

works, make sure of the following:

The computer must use Client for NetWare Networks, rather than Novell-

supplied client software.

Only user-level security (not share-level security) is available.

 The service cannot run on the same computer as SMB-based File and Printer Sharing for Microsoft Networks.

 For pass-through validation when user-level security is enabled, there must be a Windows\_Passthru account (with no password) on the NetWare server that is used as the security provider. A computer configured with File and Printer Sharing for NetWare Networks uses the NCP file-sharing protocol to share resources with MS-DOS-based Novell NetWare computers, computers running Windows NT, and computers that have Client for NetWare Networks installed.

File and Printer Sharing for NetWare Networks supports long filenames and is Plug and Play-aware. This new implementation differs from peer resource sharing in Windows for Workgroups in

two fundamental ways:

File and Printer Sharing for NetWare Networks uses the NCP protocol instead of the SMB protocol. This means that any NetWare-compatible client (Client for NetWare Networks, NETX, or VLM) can connect to a computer running File and Printer Sharing for NetWare Networks.

File and Printer Sharing for NetWare Networks uses user-level security. Access to a shared resource is based on the user's identity instead of on a password associated with that resource. The user database for verifying user identity is the bindery on a specified NetWare server.

This feature means that hundreds of NetWare users can, for example, access a shared CD-ROM using a single NetWare server connection. Also, trustee or other access rights can be defined perdirectory for a shared CD-ROM.

When File and Printer Sharing for NetWare Networks is running on a computer, the way that a peer server appears to users browsing the network depends on how the peer server advertises itself:

For another computer running Microsoft Client for NetWare Networks, the resources on the peer server appear exactly as any shared resources out the network. If the peer server is using Workgroup Advertising, it appears in a workgroup. A peer server using the Service Advertising Protocol (SAP, NetWare's Droadcasting protocol) will not appear in a workgroup, but it will appear in the Entire Network list.

For a computer running NETX or VLM, any shared directories on a peer server that uses SAP Advertising appear the same as volumes on any server. Any shared printers will appear as print queues. Most NetWare administrative commands work as expected, including RIGHTS, FILER, SYSCON, MAP, SLIST, VOLINFO, POONSOLE, and CAPTURE. If the peer server is not using SAP Advertising, then users running NETX or VLM cannot see or connect to the peer server when browsing the network.

Example During the beta test phase for Windows 95, one NetWare system administrator found the peer resource sharing service to be an administrative lifesaver. A vice president at the company had CD-ROM hardware problems just when he needed immediate access to a tax program that was available only on CD. The quickthinking administrator installed File and Printer Sharing for NetWare Networks on a computer that had a CD-ROM drive. After making sure the vice president was assigned access rights, the administrator mapped a drive on the vice president's computer to access the shared CD-ROM. The Windows 95 peer resource-sharing service allowed the administrator to provide an immediate software solution to a hardware problem that would have taken much longer to solve.

#### Configuring Browsing for Resource Sharing on NetWare

After you install File and Printer Sharing for NetWare Networks, you need to choose the method that computers browsing on the network will use to find this computer. You can browse by using two options:

 Workgroup Advertising, which uses the same broadcast method as used by workgroups on Microsoft networks.

 SAP Advertising, which is used by NetWare 2.15 and above, 3.x, and 4.x servers to advertise their presence on the network. Enable this option if you want the shared resources to be available to computers running NETX or VLM.

Note: SAP Advertising has a theoretical limit of 7,000 systems for browsing, and a practical limit of about 1,500 systems. For a large peer network, use Workgroup Advertising.

For a general discussion of browsing when using NetWare-compatible clients, see "Browsing on NetWare Networks." To specify the browsing preference:

1. In the Network option in Control
Panel, double-click on File and Printer Sharing for NetWare Networks in
the list of installed components.

Continued on page 440 SEPTEMBER 1995

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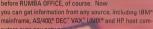
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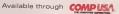
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## Windows 95 Microsoft's Resource KIT

Continued from page 436

2. In Advanced properties, select Workgroup Advertising to define how you want computers running Client for Ner-Ware Networks to see and connect to this peer server. Or, select SAP Advertising if you want NETX and VLM clients to be able to connect to this peer server,

#### If you select Workgroup Advertising. you can set the following values:

- · Disabled This computer will not be added to the browse list, and it cannot be seen by other members of the workgroup by using any method for browsing network resources.
- · Enabled: May Be Master This computer is added to the browse list and can be promoted to master browse server if the preferred master is not available
- · Enabled: Preferred Master This computer is the master browse server for the workgroup.
- . Enabled: Will Not Be Master This computer is added to the browse list by the master browse server, but it cannot be promoted to master browse server.

For more information about master browse server options, see "Building the Browse List for Microsoft Networks.

Note: If Workgroup Advertising is used, each workgroup must have a master browse server at all times to track names and addresses for computers in the

#### If you select SAP Advertising, you can set the following values:

· Disabled This computer will not advertise its presence. NETX or VLM clients cannot see it by using SLIST or other browsing options, and cannot connect to it. Users running Client for NetWare Networks can see it if Workgroup Advertising is enabled on the peer server. · Enabled This computer will advertise its

presence. It will appear in the Entire Network list. Users running VLM, NETX, and Client for NetWare Networks can see it by using any browsing method, and can connect to it as they do any server.

By default, computers running File and Printer Sharing for NetWare Networks are placed in and browsed by workgroups. You can use the Identification properties in the Network option in Control Panel to specify the workgroup and computer name for the computer.

Although computers that use SAP Advertising appear in the list of NetWare servers, you cannot use them in all the same ways that you use NetWare servers.

. When using NETX, you cannot log on to a computer running Windows 95 at the command line, although you can attach to one and map drives to its directories.

- . When using VLM, you cannot log on to a computer running Windows 95 at the command line, but you can run a Login /ns command and use the Login button in the NWUSER utility
- . If you run SYSCON on a NetWare server, you can change the server to one of the computers running Windows 95. However, the computer running Windows 95 does not have a bindery, so when you display all the users (or groups) in SYSCON, you will see the user list (or group list) from the NetWare server that was selected as the user-level security provider.
- . If you run VOLINFO on a NetWare server, you can select one of the computers running Windows 95 and display its volume information (if you are attached to it). This shows all the available shared disk resources for the computer running Windows 95.

In Windows 95, you can do the same things to resources on computers running File and Printer Sharing for NetWare Networks as you can to any other network resource. If you have appropriate rights to connect to the shared resources, you can also create a link to the computer or map a drive to its shared directories, and so on.

#### Controlling Access to Peer Server Resources on NetWare Networks

You can add to the list of users who can access the resources on the peer server. To do this, add the users to the NetWare passthrough server that provides security. These users can then be given access to the peer server by adding them to Sharing properties associated with the shared resource.

Passwords for users' resources on the peer server are the same as those for the NetWare pass-through server. Passwords must be changed at that server, as described in "Unified System Log-on Basics."

To make sure all users have the required server access, make sure that one NerWare server on the network has the accounts for all users or all servers, and then set that server as the security provider for every computer configured with File and Printer Sharing for NetWare Networks. If server access is not set properly, each

time the computer running Windows 95 is started a message warns that the passthrough server has not been specified.

To share a directory and specify users

#### on a NetWare network:

- 1. In Explorer, right-click on the directory you want to share. Select Sharing. 2. In the Sharing dialog box, type a share name for the directory.
- 3. Click on the Add button. In the Add Users dialog box, select the user name in the list on the left, and then click on the related button to specify the kind of access that user is allowed.

For more information about specifying directory access rights, see "Security."

When the computer running Windows 95 receives a request from a user attempting to access a shared device, Windows 95 uses the NetWare server to validate the user name or group membership. If the name or group membership is validated. Windows 95 checks to see if this validated name or group has been granted access rights to the shared resource, and then it grants or denies the connection request.

Share Names vs. NetWare Volume Names When you share resources on a local hard disk drive using File and Printer Sharing for NetWare Networks, the share name associated with the shared directory structure becomes a volume name in the Novell designation server/volume: or in the UNC designation \\server\volume.You can use the UNC designation with network commands to connect to and disconnect either from Microsoft networking \\server\sharename shares or from NetWare server/volume shares. Windows 95 does not make this distinction between shares and volumes because all shares and volumes appear as directories (also called folders). This distinction becomes important when you use NETX or VLM and NetWare utilities. NetWare does not use or understand the concept of share names. NetWare uses volumes for drive resources and print queue names for print resources. Therefore, for a shared drive or printer resource to be available to all the different types of clients, when a computer configured with File and Printer Sharing for NetWare Networks shares a drive resource, the share name

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# Windows 95 MICROSOFT'S RESOURCE KIT

Continued from page 440

becomes equivalent to a NetWare volume. When the same computer shares a printer resource, the share name becomes equivalent to the NetWare print queue.

Directory Share Name = Volume Printer Share Name = Print Queue

Using WinPopup You can use Win-Popup to send a message to one person or to an entire workgroup. WinPopup can also display a message from someone else on your network or from a printer when your print job is done. With WinPopup, you can send and receive messages and alerts from LAN Manager, Windows for Workgroups, Windows NT, and Windows 95 serves and clients.

On a NetWare network, you can also use WinPopup to send messages in the following cases:

If you are running a NetWare-compatible client, you can receive pop-up messages from the server to which you are attached. You can also receive messages from other users running Novell-supplied network clients if the message is sent to you on the server using NetWare utilities.

You can use WinPopup to send a message to a user on a computer running Client for NetWare Networks or a Novell-supplied client if that user is attached to your preferred server.

 If you are running both Client for Net-Ware Networks and Client for Microsoft Networks, and if the message reaches the specified computer or user through Windows 95 networking, the message is not also sent through the Net-Ware server.

WinPopup is installed automatically with both Client for NetWare Networks and Client for Microsoft Networks.

To configure WinPopup on a client computer:

Place WINPOPUP.EXE in the Startup folder on each computer.

On each computer, click on the Messages Menu, and then click on Options to specify choices for how WinPopup will present messages.

To send a message using WinPopup: 1. Click on the Send button on the toolbar. Or, select Messages, Send.

Click on an option to specify whether to send the message to a specific user or computer or to a workgroup. Then type the recipient's name.

Type a message, and then click on OK. As an example of how this might be used in a workgroup, you might want to run WinPopup on a computer running File and Printer Sharing services. Every computer in the workgroup that uses shared resources on this computer can also run WinPopup. On each client computer, WinPopup can report messages from the printer (such as notification that a print job has been completed). Or administrators can send messages to users and computers in the workgroup with pop-up notification.

To remove WinPopup from a computer, use the Add/Remove Programs option in Control Panel.

#### About NetBEUI

Windows 95 provides the NetBIGS extended user interface (NetBEUI) protocol for compatibility with existing networks that use NetBEUI. Because NetBEUI is nonroutable and was designed for smaller LANs, you should use the TCP/IP or IPX/SFX-compatible protocol for enterprisewide networks that require a routable protocol.

NetBEUI in Windows 95 supports a NetBIOS programming interface that conforms to the IBM NetBEUI specifications and includes several performance enhancements. The NetBEUI module, NETBEUI.VXD, is accessible through the NetBIOS interface.

If Setup detects NetBEUI, it installs support for MS NetBEUI automatically. You can add this protocol at any time. The Advanced properties for NetBEUI affect only real-mode NetBEUI. These values are set dynamically for protected-mode NetBEUI.

To configure real-mode NetBEUI manually:

 In the Network option in Control Panel, click on the Configuration tab. Then double-click on Microsoft Net-BEUI. If your computer has multiple

network adapters, an instance of Net-BEUI appears for each network adapter. You must configure each adapter with its own settings. The Bindings tab shows which clients and services are currently using the NetBEUI protocol. For more information about configuring bindings, see "Configuring Network Adapters."

Click on the Advanced tab to modify settings for Maximum Sessions and NCBs for the real-mode NetBEUI.

· Maximum Sessions Used to identify

the maximum number of connections to remote computers that can be supported from the redirector. This is equivalent to the sessions= parameter formerly specified in PROTOCOL.INI.

NCBS (network control blocks) Used to identify the maximum number of Net-BIOS commands that can be used. This is equivalent to the ncbs= parameter former-ly specified in PROTOCOL.INI.

 Click on OK. Then shut down and restart the computer.

#### About TCP/IP

Microsoft TCP/IP provides communication across interconnected networks that use diverse hardware architectures and various operating systems. TCP/IP can be used to communicate with computers running Windows 95, devices using other Microsoft networking products, or non-Microsoft systems such as Univ.

Microsoft TCP/IP provides all the following elements necessary for networking:

- Core TCP/IP protocols, including the Transmission Control Protocol (TCP), Internet Protocol (IP), User Datagram Protocol (UDP), Address Resolution Protocol (ARP), Internet Control Message Protocol (ICMP), and Domain Name Protocol (DNP). This suite of Internet protocols provides a set of standards for how computers communicate and how networks are interconnected.
- Support for APIs, including Windows Sockets and NetBIOS.
- TCP/IP diagnostic tools to detect and resolve TCP/IP networking problems, including arp, ftp, nbtstat, netstata, ping, route, and tracert, plus Windows-based Telnet and IP Configuration utilities.

In addition, when you install Microsoft TCP/IP under Windows 95, the following enhancements are included:

- Client for DHCP, for automatic configuration of computers running TCP/IP on networks that have DHCP servers.
- Client for WINS, for dynamic resolution of IP addresses to computer names on networks that have WINS servers.
- Point-to-Point Protocol, for asynchronous communication, as described in "Dial-Up Networking and Mobile

in "Dial-Up Networking and Mobile Computing." For a summary of the command-line options for TCP/IP utilities, see "Com-

identify mand-Line Commands Summary."

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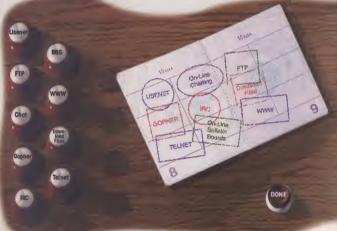
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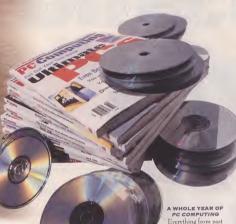
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#### SPEC WATCH

#### Windows 95 Hardware

Drum Roll Are you ready for Windows 95? Is your system ready? Can you make do with your existing PC or should you consider an upgrade? And what are



an upgrade? And what are the minimum requirements for this new operating system to run smoothly? Technical Director Adam Meyerson discusses Windows 95's demands on your systems and peripherals, and the importance of Plug and Play.

455

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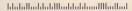
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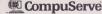
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# Spotlight on Direct To You

### DTY Guest Commentary

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# Direct to You spec watch: Don't Settle for Less Than These Specs

DO YOU NEED A NEW SYSTEM?

# Gearing Up for Windows 95

s your system ready to take on Windows 95? Is your twoyear-old PC obsolete? If you're planning to move up to Windows 95, you should answer these questions first. Because of increasing demands on RAM and hard disk space, some users will need to upgrade their systems, others will need to replace them. In many cases, your existing hardware will

be adequate, but to get the most out of this new 32-bit operating system and its applications, you may need to invest in an upgrade.

For example, Microsoft says you can run Windows 95 on a 386 with 4MB of RAM. That's absolutely true. Unless you also want to run applications, that is. To run even basic word processing and spreadsheet applications, you'll want at least a 66MHz 486 with 8MB of memory. Windows 95 also takes up at least 30MB of free hard disk strace, so

any system you consider should include at least a 500MB or larger hard drive to leave room for applications and data.

What about your existing add-in devices? You sound eard, CD-ROM drive, graphics adapter, and I/O controllers work perfectly now. Will they work as well under Windows 95, or will you have to replace them with Plug-and-Play devices? The answer is yes (to both). Windows 95 supports legacy bardware, and when it works. Plug and Play

does make life much easier. But even with Plug and Play, as you add new devices it gets more difficult to make everything work together. A true Plug-and-Play system should have a Plug-and-Play BIOS and Plug-and-Play devices. Throw a Plug-and-Play operating system like Windows 95 into the mix, and you have the easiest hardware configuration this side of Anole.

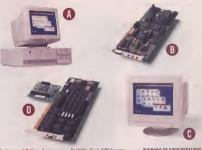
Plug and Play is smart enough to work with your existing (legacy) devices, too, although you'll need to identify them manually. If there's no protected-mode driver available for a certain device, you can use the old real-mode driver (and pray that the vendor comes through with new drivers). The bottom line is that you may be able to hold on to your existing computer—but for you're planning to buy a new one, don't settle for less than a full Plug-and-Play system.

ADAM MEYERSON

#### PLUG-AND-PLAY

A WINDOWS 95-READY SYSTEM

- A. Desktop System: A Plug-and-Play BIOS is key to automatic setup.
- **B. Sound Card:** It should install automatically—no jumpers, no dip switches.
- C. Monitor: Features like power management and refresh rates are set transparently (but the graphics board must be Plug and Play, too).
- **D. Graphics Board:** The system configures the board and installs the driver without your intervention.



Features and Options: A minimum of a 66MHz 4860X2, 8MB of RAM, and a 500MB hard disk. Ideally, look for a Pentium with 16MB and a 16B hard disk. We also recommend a 16-bit Sound Blaster-compatible sound card, 5.25-inch drive bays, a graphics accelerator with 4MB of RAM, and six-speed CD-ROM drive.

Usability: Flash BIOS for easy upgrades, tool-free cover removal, zero insertion force (ZIF)-upgradable CPU socket, and easy access to SIMMs. WINDOWS 95 CONSIDERATIONS: A Pilg-and-Play BIOS lets Windows 95 reconfigure motherboard resources if a conflict arises. Even without a Pilg-and-Play BIOS, Windows 95 can detect the resources used and reconfigure a Pilgand-Play peripheral.

# Direct to YOU SPEC WATCH: Don't Settle for Less Than These Specs

#### HIGH-END DESKTOP SYSTEMS



CPU: 90MHz to 133MHz Pentium

RAM: 16MB.

Secondary CPU Cache: 256K.

Display: 17-inch, 1,024 by 768 at 72Hz or higher refresh rates.

Video Card: 64-bit PCI graphics accelerator, 2MB of VRAM or WRAM, 72Hz or

higher refresh rates. Hard Drive: 1GB.

Bus: Six slots including two PCI.

Features and Options compatible sound card. four available halfbays, 21-inch monitor. graphics accelerator with 4MB of RAM six-sneed CD-ROM drive

Usability: Flash BIOS easy access to SIMMs.

WINDOWS 95 CONSIDERATIONS: A Plug-and-Play BIOS lets Windows 95 reconfigure motherboard resources if a conflict arises. Even without a Plug-and-Play BIOS. Windows 95 can

detect resources and reconfigure a Plug-and-Play peripheral, Note that many Plug-and-Play BIOSs came out long before Windows 95. Check your BIOS date and upgrade it if a newer version is available.

#### NETWORK FILE SERVERS



75MHz Pentium RAM: 16MB expandable to

128MB, 72-pin SIMMs.

Secondary CPU Cache: 256K.

Display: 14-inch capable of 640 by 480 resolution.

Video Card: 512K of RAM.

Hard Drive: 2GB SCSI-2.

CD-ROM Drive: Quad-speed.

Bus: Eight slots with a combination of EISA and PCL

Features and Ontions-Server management SCSI-2, DAT backup. locking cabinet, integrated controller, two COM ports. one parallel port.

Usability: Flash BIOS for easy upgrades, hot-swappable hard disks. upgradable CPU socket. easy access to SIMMs.

CONSIDERATIONS: For peer-to-peer networks you don't need a server. All you need are network cards-Ethernet for example-and the appropriate cabling Client drivers include support for NetWare. Windows NT. Banyan

VINES, and SunSoft

#### ENTRY-LEVEL DESKTOP SYSTEMS



CPU: 66MHz 486DX2

RAM: 8MB expandable to 32MB, 72-pin SIMMs.

Secondary CPU Cache: 256K.

Display: 15-inch, 800 by 600 at 72Hz or higher refresh rates.

Video Card: 64-bit graphics accelerator, 1MB of DRAM. 72Hz or higher refresh rates at all resolutions

Hard Drive: 500MB FIDE

Bus: Six slots including two PCI.

Features and Options: 16-bit Sound Blasterdrive bays, 2MB of memory on graphics accelerator. for easy upgrades, tool-free cover removal.

upgradable CPU socket, easy access to SIMMs. WINDOWS 95 CONSIDERATIONS: A

Plug-and-Play BIOS lets Windows 95 reconfigure motherboard resources if a conflict arises. Even without a Plug-and-Play Bios, Windows 95 can reconfigure a Plug-and-Play peripheral. Note that many Plug-and-Play before Windows 95 Check your BIOS date and upgrade it if a newer

version is available

#### NETWORK APPLICATION SERVERS



CPU: 100MHz, 120MHz, or 133MHz Pentium.

RAM: 32MB expandable to 256MB, 72-pin SIMMs.

Secondary CPU Cache: 512K. Display: 14-inch capable of

640 by 480 resolution. Video Card: 512K of RAM

Hard Drive: 2GB SCSI-2. CD-ROM Drive: Quad-speed.

Bus: Eight slots with a combination of EISA and PCI. Features and Options: architecture, RAID-5. wide SCSI-2, DAT backup. uninterruptible power supply, two half-height inch drive bays with front-

**Usability:** Server management software upgrades, hot-swappable CPU socket, easy access

WINDOWS 95 CONSIDERATIONS: For peer-to-peer networks you don't need a server. All you need are network cards—Ethernet for example-and the appropriate cabling.

Client drivers include support for NetWare. Windows NT, Banyan VINES, and SunSoft.

#### WINDOWS MONITORS



Size: 17-inch: 20- to 21-inch for CAD, desktop publishing, or graphics applications.

Resolutions: 1,024 by 768 for 17-inch; 1,280 by 1,024 for 20and 21-inch: 1,600 by 1,280 for CAD and document imaging.

Dot Pitch: 0.28mm or smaller for 17-inch 0.31mm or smaller for 20- and 21-inch.

Vertical Refresh Rate: 72Hz or higher at all resolutions.

Tube Type: Flat-square or Trinitron.

Features and Options: Support for MPR II lowand refresh rates

Usability: Adjustable tilt-and-swivel base. anscreen controls

WINDOWS 95 CONSIDERATIONS: Plug-and-Play support lets Windows 95 automatically identify a monitor (a Plug-and-Play graphics card is required) and select the proper video resolution.

#### GRAPHICS ACCELERATORS



Resolutions: 800 by 600 for 15-inch monitors; 1,024 by 768 for 17-inch: 1.280 by 1.024 for 20- and 21-inch.

Colors: 256 colors for business applications; 65,000 colors (or more) for near-photoquality images.

Vertical Refresh Rates: 72Hz or higher at all resolutions.

RAM: 1MB of DRAM for 256 colors at 1.024 by 768; 2MB of VRAM or WRAM higher specs. Features and Options: For Windows systems, a ESA advanced feature media channel (VMC)

Heability-Virtual deskton

WINDOWS 95 CONSIDERATIONS: Plug-and-Play support automatically identify video cards and configure them. Even non-Plug-and-Play video cards may be Identified. but must be reconfigured manually, Windows 95 has a utility for switching resolutions and color depth, and for power management. Plug-and-Play support in your video card is required to take advantage of Plugand-Play monitors.

#### CD-ROM DRIVES



Access Time: 200ms.

Transfer Rate: 600KBps (quad-speed drive).

Cache: 64K on drive.

Interface: EIDE or SCSI-2.

Compatibility: High Sierra and ISO-9660, CD-Audio and Kodak Photo CD (for still photography) with multisession support (MPC 2).

Audio: Output jack and volume control.

Features and Options: CD changer holding two

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Mode: Stereo.

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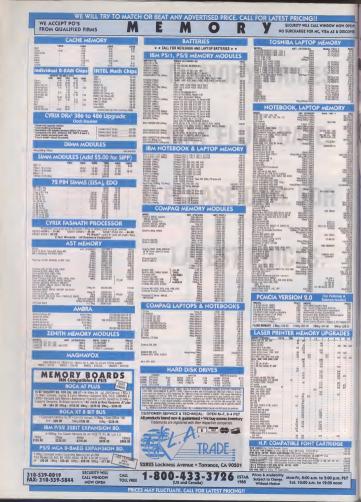
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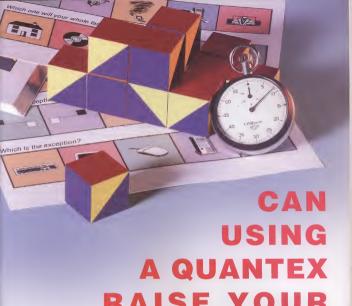






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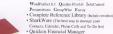
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Windows 95 Software

1002

PCC 9/95-4

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#### Please answer questions below

Add-in Board

1. Where do you use your computer? (Check one only)

2. Business 1. Home 2. What kinds of computers do you use? (Check all that apply): 1. | IBM/Competible Laptop 2 | IBM/Compatible Desktop

. On you plan to buy any of the herdwere or activere mentioned below in the next three menthal (Check all that apply) HAROWARE 22. Programming Language

MAC Laptop

Spreadsheet Personal Finance Desktop Publishing Utility

Compiler 23. Integrated/Multifu 24 CAD CD-RDM

Modern Input Device Local Area Network Windows/Multi-tasking

ee personal computer products? (Check all that apply): Specialty Computer Retail Stores
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- 1. Where do you use your computer? (Check one only)
- 2 Business What kinds of computers do you use? (Check all that apply).
   I I I IBM/Compatible Lepton 2 I IBM/Compatible Deckton 3 I MAC
- 3. Do you plen to buy eny of the herdwere or coftwere mentioned below in the next three months?

HARDWARE	SOFTWARE	
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2 MAC	<ol> <li>Spreadsheet</li> </ol>	Compiler
3 Laptop	14. Personal Finance	23 Integrated/Multifunction
4   Printer	15 Desktop Publishing	24 🗆 CAD
5. Mondor	18. Word Processor	25 CD-ROM
6 Disk/Tape Back-up	<ol> <li>Database Manager</li> </ol>	26 On-Line Services
7. Add-in Board	18 Graphics	
8 [] Modem	19 🗆 Utility	
9 Input Device	20. Communications	
10. Local Area Network	21. Windows/Multi-tasking	

- 10. Local Area Network

  11. Windows 4. From which of the following sources do you purchase personal computer products? (Check all that apply):
- Specialty Computer Retail Stores
   Mail Order Firms 3. Direct from Manufacturers

For information on all of the Windows 95 products in this issue, circle the appropriate number(s) below. Windows 95 Hardware Windows 95 Software PLEASE PRINT CLEARLY 1001 1002

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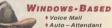
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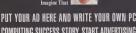
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#### Web Navigation

Netscape's Navigator Personal Edition brings you the power of Navigator with the convenience of onebutton I-Way access via your choice of five service providers.

Navigator Personal Edition / Netscape Communications Corp. / (415) 254-1900 / \$39 est. street price. Reader Service No. 636

### Anchor Your Pages

How useful is data on your Web page if you don't have an index? Check out Iconovex AnchorPage, a powerful, automatic HTML indexing tool.

Iconovex AnchorPage / Iconovex Corp. / (800) 943-0292 / \$895 list / Reader Service No. 637

#### I-Way Meets Office CompuServe's Internet

Office 4.0 evolved from Spry's Air Series 3.0 and includes all the tools you need to I-Way-enable your LANs and WANs.

Internet Office 4.0 / CompuServe / (800)777-9638 / \$49 to \$499 est, street price, depending on configuration / Reader Service No. 638 VRML VERTIGO

## 3-D Hits Cyberspace

Imagine being able to float through a cyberscene, moving up, down, forward, backward, sideways-you name it. Forget browsing and clicking with a mouse; you'll soon be flying through sites with Virtual Reality Modeling Language (VRML), a technology that brings 3-D images to the World Wide Web, Several VRML projects are currently under way, including InterVista Software's WorldView and Silicon Graphics' WebSpace. For businesses looking to

For Dusnesses looking to attract more hits to their home pages, YRML could be just the draw they need. Instead of seaming and clicking on a list of products as with conventional HTML, you float through a virtual store, and pick up and rotate the products for sale. Dozens of commercial organizations and companies—including Walt Disney, Ford Motors, and



Take Flight: Virtual Reality Modeling Language brings three-dimensional graphics to the World Wide Web.

Sony—have endorsed VRML 1.0 as an open standard for Web-based 3-D imaging.

The push to enliven the Web through innovative interactive technologies doesn't stop with VRML Additional projects, such as Fujitsu Cultural Technologies' Worlds-Away, a two-dimensional, animated online community, and Worlds Inc.'s Worlds Chat, a 3-D graphical Web technology, are redefining the

online experience as well. And soon, these 3-D worlds will be animated via distributed applications. One such project is Sun Microsystem's Hodyawa (http://jawa.sun.com), which allows applets to be embedded and distributed on the Web. Currently, a special viewer, or interface, is required to access these technologies. See our "One Minute Guide," below, for information on where to find VRML viewers and sites.

#### **ONE-MINUTE GUIDE**

### VRML Viewers: 3-D Glasses for Your Browser

If you want to enjoy 3-D surfing, you'll need to add one of these VRML viewers:

WORLDVIEW InterVista's WorldView is a VRML viewer for Windows 3.11, Windows NT, and Windows 95 (http://www.hyperion.com/intervista/technology.html/).

webspace Silicon Graphics' WebSpace works only on high-end Silicon Graphics workstations, but a new Windows version of WebSpace is expected to be available soon (http://www.sgi.com/Products /WebFORCE/WebSpace/).

VRML STUDIO NeTpower's VRML Studio is a 3-D viewer (http://www.netpower.com/).

WIRL Vream's Web Interactive Reality Layer (WIRL) is a 3-D Web viewer (http://www.vream.com/vream/index.html).

VRML REPOSITORY The VRML Repository site at the San Diego Supercomputer Center offers links to VRML software (http://www.sdsc.edu/vrml/).

VRML FAQS Got a question about VRML? Chances are it's been answered here (http://www.oki.com/vrml/VRML\_FAQ.html).

worlds char Worlds Inc.'s fully navigational, 3-D Web environment is the same technology used by Steven Spielberg's Starbright Pediatric Network for hospitalized children (http://www.kaworlds.com/).

## Free Stuff!



Bill Wants to Be Your Sledgehammer A free ZDI screen saver featuring Bill Gates, Windows 95, and a sledgehammer.

PC Contact: qdw95.zip/Library 7 Size/Time\*: 200K/5

Free Connection, but Act Fast Get ConnectSoft's E-Mail Connection 2.5. an Internet in-box, for free-and see whether you fancy upgrading to 3.0.

PC Contact: FMC25.exe/Library 5 Site: http://www.connectsoft.com/ Size/Time\*: 1.3MB/50 Power Utility for Resource Tracking

InfoSpy packs a system sentry, a program-usage log, memory, and more in a Windows 95-friendly package.

PC Contact: ISPY24.ZIP/Library 0 Size/Time\*: 700K/18 As Seen on TV! Simpson-Goldman Animation

Forensic animations that recreate the Simpson-Goldman murders, as shown on enet central. Site: http://www.cnet.com/Central/Tv/Top/murder.html Size/Time\*: 1.6MB/60

Keep All Your Working Files in One Place \*\*\* Award-winning Drag N Doc creates working folders for all the files you need for that big project.

PC Contact: DRAGND.ZIP/Library 7 Size/Time\*: 350K/6

Instant File Access 3.02 Now for Windows 95 Pump up your File Open and Save dialogs with a command history, toolbar, file find, and floating file lists.

PC Contact: IFA302.zip/Library 11 Size/Time\*: 300K/6 \*\*\* Your PC as a \$3,000 Radio

Many sites now use Real Audio: tune in with a single download. Site: http://www.realaudio.com/dloadintro.html Size/Time\*: 800K/20

Neither Rain, Nor Snow, Nor Dead of Night . . .

Check your postal charges with Electronic Postal Window before you ship that package. PC Contact: epw15.zip/Library 11 Size/Time\*: 250K/5

32-Bit WinZip Tooled for Windows 95 Everyone uses ZIP archives—and nobody wants 16-bit apps under Windows 95—so get the latest WinZip.

Site: http://www.winzip.com/winzip/ Size/Time\*: 288K/7 Reach Out and Touch Someone on the Internet \*\*\*

Try out VocalTec's long-distance Internet phone calls one minute at a time. Site: http://www.vocaltec.com/dnload.html Size/Time\*: 750K/19

\*FILE SIZES QUOTED ARE THE BYTES IN THE ZIP FILE, DOWNLOAD TIMES CITED IN MINUTES AT 14 4KBPS THE WEB IS DYNAMIC BY NATURE, WEB SITE URLS AND FTP SERVERS MAY CHANGE WITHOUT NOTICE

### Package Deals: Coming to a Modem Near You

#### WINDOWS TECH PACK

Pick up this fistful of useful Windows technical information. as well as specs bundled and ready for you to read, use, and pass around to all your friends. PC Contact, Library 0, wintec.zip, 60K/2

hourglasses are too passé. Here are dozens of easyto-use alternatives, ready for quick, painless installation under Windows 95. PC Contact, Library 0, 95curs.zip, 60K/2

WINDOWS 95 CURSORS

Regular pointers and

#### WINDOWS ICONS

With OLE and shortcuts aplenty, you've probably never had a greater desire for lots of desktop icons. Hurry and get 'em in one handy packagewhile they last. PC Contact, Library 0, 95curs.zip, 60K/2

Matthew Lake's Ratings: \*\*\*\* A sight for sore eyes. \*\*\* A sight better than usual. \*\*\* Worth seeing. \*\* Seen it, done it, got the T-shirt. \* Unsightly.

### **Imsites**

BINARY BANKING Check the balance of

REAR WINDOW HRI Surf the Alfred filmography, cameo listings, and quotes http://nextrich.mtv.itesm.mx/~nlonezn/Kani



I-WAY VIA CARLE TV Cnet central brings the

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SHARE AND SHAREWARE ALIKE The Virtual Shareware Library brings you more than http://www.acs.oakland.edu/cgi-bin/shase

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Contributors: JAMES OLIVER CURY, MATTHEW LAKE, and SCOTT NAYLOR. Written and edited by RICH SCHWERIN. I-Way report to share? Outstanding download? E-mail RICH SCHWERIN at Rich Schwerin@zd.com.

### **Join PC Computing Online**



You've experienced PC Computing on paper, why not try it online? Choose from PC Contact, which

is our CompuServe forum, or PC Computing Web Edition, which is our home page on the World Wide Web. There's also a new quarterly CD-ROM that shouldn't be missed. and in the future you'll want to look for PC Computing on AT&T's Interchange Online Network and the Microsoft Network, Download all of the free stuff and shareware that we mention each month from our CompuServe/ZiffNet forum, PC Contact (GO ZNT:PCCONTACT). For free information, type GO ZNT:ZIEEHELP and download GOWORD.TXT and FREE.TXT from data library 1 (General Information). Here's how to join ZiffNet and get into PC Contact:

 Call CompuServe at (800) 848-8199 for a local access number. Set your software to 7 data bits, even parity, 1 stop bit, full duplex, and dial the service.

3. Press Ctrl-C to get the system's attention, and at the HOST NAME prompt, type CIS and press Enter.

 For USER ID, type 177000,5300, and at the PASSWORD prompt, type PC/CONTACT.

At the ENTER AGREEMENT NUMBER prompt, type PCC95.

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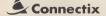
includes articles from past issues where and when you want them so that you can instantly search out megabytes of information and software. The disc also features columnists Ed Bott, Ron White, and John C. Dvorak, For subscription information, call (800) 335-1196. In the second CD volume: everything

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## **Shoot the Works.**

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System Requirements: A PC equipped with a 386, 486, Pentium or equivalent processor
 Windows 3.1 or 3.11, Windows for Workgroups 3.1 or 3.11 • 4 MB RAM required













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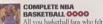
## **CD-RON**White

## SPORTING LIFE

This is not something a man usually admits: I'm dumb about sports. My knowledge is limited to the fact that between concert tours, Michael Jackson plays for Chicago's basketball team. So I've tried to unravel the mysteries with help from this month's selection of CDs. And you know, a bunch of them turned out to be really interesting.



Basket Case: A towering CD-even among 7-foot-tall pituitary cases.



#### COMPLETE NBA **BASKETBALL 0000**

neglected when Microsoft released Complete Baseball can sit back and pop open another beer. Microsoft emulates the factsoaked, video-packed Windows baseball CD with Complete NBA Basketball. It has the cream of video highlights, and stats out the wazoo. If you're so obsessed with B-ball that an entire CD-ROM full of scores, trivia, and memories can't satisfy you, you even have the chance to subscribe to Microsoft's daily basketball e-news. The only problem with it-and I'm sure you'll agree it's a serious shortcoming-is that it doesn't mention Michael Jackson even once. It's a good thing I read Wheaties boxes for supplementary information.

Complete NBA Basketball / Microsoft Corp. / (800) 426-9400, (206) 882-8080 / \$49.95 est. street pnce / Reader Service No. 622



#### **FLY-FISHING: GREAT RIVERS OF THE WEST** --- 00000

I know only one fly fisherman who has checked out this CD, and he vouches for the accuracy of its advice on tackle, techniques, flies, and rivers, (His exact words were, "You'll never see your CD again.") My suspicion is that people fly-fish because of some weird, low-key mystical experience-like chanting the Contract with America in time to finger cymbals. This Windows CD has beautiful art, photos, and mans. Some of the multimedia seems kind of silly to me-like the bubbling water in the sounds gallery. But to the enthusiast, it's all part of being one with the fly. Don't take my word for it. Trust your karma.

Fly-Fishing: Great Rivers of the West / IVI Publishing / (800) 432-1332, (612) 996-6000 / S35 est. street price / Reader Service No. 623



Casting Around: Mild activity, open air, sharp weapons, and funny vests.



#### THE AMERICAN GOLE **GUIDE PRESENTED BY** ARNOLD PALMER OO

Golf players are of a stranger breed than average sports fans, who generally lounge in bed on weekends until the cartoons are over, watch sports, and then sleep on the couch during halftime after building pyramids of empty beer cans. Golfers, on the other hand, get up early on weekends so they can walk in the hot sun chasing tiny balls through fields. They just might be crazy enough to like The American Golf Guide, This Windows CD contains information on 14,000 golf courses across the country. It does a decent job, but where's Palmer, other than in the cover photo?

The American Golf Guide Presented by Arnold Palmer / DataTech Software / (800) 556-7526 / \$29.95 est. street price / Reader Service No. 624



#### THE MASTERS 0000 Well, Palmer is in The Masters

CD-ROM, which sacrifices the breadth of The American Golf Guide for a glorious, in-depth presentation on the Masters Tournament and the Atlanta course where it's played. Each hole gets an individual illustration, animation showing its slope, aerial fly-by, text description, and videos showing how different players have conquered it. The Windows CD also has a chestful of anecdotes, statistics, photos, rules, and, well, it has just about everything on the subject, short of packing a piece of the green in the jewel case.

The Masters / Creative Multimedia / (800) 262-7668, (503) 241-4351 / \$40 est. street price / Reader Service No. 625



#### **EXTREME SPORTS 000** Now this is sports as they

should be played; by someone else. Extreme Sports specializes in showing others risking their necks while ice

OOOOO Bottom of ninth, bases-loaded home run. OOOO Sudden-death overtime win. OOO Wins by a nose. OO Rained out. O Touchdown—for the other team.

PC COMPUTING

### CD-RONWhite

climbing, skydiving, bungee jumping, white-water kayaking, and doing other activities that let you hit the earth at high speeds. This Windows CD is attractive. well thought-out, and stuffed with whiteknuckle videos. It also offers advice on equipment, locations, techniques, motivation, and how to stay alive if you decide to give up being a PC potato and actually participate in any of the sports you see here.

Extreme Sports / Medio Multimedia / (800) 788-3866 (206) 867-5500 / \$19.95 est. street price / Reader Service No. 626



Here's a sports CD that's more than just a celebration of sweating.

Mountain Biking is a complete guide to the hows and whys of peddling. The interface looks like Druid runes scribbled on pebbles. But with a bit more practice than it took you to stay upright on a two-wheeler, you can explore the disc to learn about esoterica such as whether to stand on the pedals. Experienced bikers may be too advanced for some of this, but for someone just entering the sport, it's a good place to start.

Mountain Biking / Media Mosaic / (800) 972-3766. (503) 225-1988 / \$50 est. street price / Reader Service No. 627



#### THE MARTIAL ARTS **EXPLORER 000**

Ah, Grasshopper, you wish to learn the secrets of ancient martial arts? First, you must grasp the art of using this Windows CD. You cannot rely on your sense of Western logic. As the title says, it's an exploration. There's as much here for the brain as there is for the muscles. The CD opens with a disclaimer that it's not responsible for injuries if you decide to pick on someone twice your size, but the only body part you're likely to strain while watching this CD is your rear end.

The Martial Arts Explorer / Future Vision Multimedia / (800) 472-8777, (914) 428-0400 / \$40 est. street price / Reader Service No. 628



### I. M. MEEN OOO

Most red-blooded adults like Doom, Lots of guts, lots of splatters. But for red-blooded kids, I. M. Meen sounds like a better idea-at first. This DOS-based CD is a milder 3-D

maze, full of lurking trolls and giant spiders. When the baddies are tromped, they disappear without bloodshed. But wouldn't you know it, somebody had to ruin the fun by trying to add redeeming educational value. To make progress, the player must do homework! You beat up a bad guy, and your reward is correcting punctuation. Oh. boy. What fun. My guess is that as soon as Mom leaves the room, the kids will switch to Doom.

I. M. Meen / Simon & Schuster Interactive / (800) 983-5333, (212) 698-7114/ \$49.95 est, street price / Reader Service No. 629



Unnecessary Blandness: Unfulfilled promise of mindless violence.



#### UNNECESSARY **ROUGHNESS '95 0**

Now we're talking! Low body blows, Clipping, Head injuries, Shattered spines. The stuff of real sport. But wait. Unnecessary Roughness is tame-a combination of football rotisserie, team play, and minimalist video game. You choose a couple of teams, call the plays, and exert vague control over the quarterback via a DOS interface that defies understanding. Where's the blood? The concussions? There's more violence on C-SPAN.

Unnecessary Roughness '95 / Sport Accolade / (800) 245-7744, (408) 985-1700 / \$40 est. street price / Reader Service No. 620



#### LAST CHANCE TO SEE 0000

CD-ROMs should be freewheeling collections of splashy video, gorgeous photographs, and ear-ringing music and sound effects. This is why Last Chance to See shouldn't work as a CD-ROM. But it does. Based on a book and photographs by Douglas Adams and Mark Carwardine, this CD shows the two men exploring remote and inconvenient places in search of nearly extinct animals. The CD works well because of Adams's droll humor on a topic that has no joviality of its own. Adams, author of the five books in the Hitchhiker's Guide trilogy, narrates the tale as if he, too, expects to become extinct at the hands of swarming insects and bureaucrats. There's no multimedia sizzle, so just sit back, listen, and look at the photos. It's a fascinating journey.

Last Chance to See / Voyager / (800) 446-2001. (212) 431-5199 / \$40 est. street price / Reader Service No. 63 I



#### **MULTIMEDIA DOGS** 0000

**MULTIMEDIA CATS** 0000

There's no reasoning with pet lovers. Fido can tear your throat, and his owner will simply say, "Oh, he's teething." Pet freaks would drool over these CDs even if they were done atrociously. But they're not. Both the dog and cat editions are packed with photos, video, and text on hundreds of breeds-and you don't have to be a pet fanatic to enjoy them. Don't know what puppy or kitty to get? Tell the Fetch feature your preferences about size, shedding, trainability, and so on. Each CD produces a ratings list based on your choices. Additional information is as limitless as Rover's loyalty-covering everything from kennel shows, breeder directories, grooming, and health care, to a gallery of celebrity dogs. These CDs are the dog's meow.

Multimedia Dogs: The Complete Interactive Guide to Dogs 2.0; Multimedia Cats: The Complete Interactive Guide to Cats / Inroads Interactive / (303) 444-0632 / \$30 each, est. street price / Reader Service No. 632



Not a Bowser: Make no bones about it-this will be a dog lover's best friend.

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One Hard Floppy; Didn't think there was a high-end floppy disk, did you? Well, 3M's Go Anywhere double-sided, double-density 1-4MB floppy fight) includes an antifungal film formulation that resists high temperatures and humidity. But kids, don't try this maneuver at home. Go Anywhere / SM / 1000 (888-1889 / 512 est. street price pertur-pack / Red \* 27mic r No. 47mic r No. 47m

Handheld Hell: Anything that sits easily in your hand can just as easily fall to the ground. These über-pen-based PDAs resist water, extreme temperatures, humidity, and shock Kalidor's K210 486SXLC (bottom left) runs Windows or other pen-based systems. Digital Ocean's Tarpon (bottom right) integrates Apple's Newton with a wireless adapter in a water-resistant rubbery case.



FC-486 / Husky Computers / (813) 530-4141 / \$2,999 list (base price) / Reader Service No. 644

Field PC / Keithley MetraByte / (800) 348-0033 / 57,995 list (base price) / Reader Service No. 645



Suspend Disbelief: Can't afford an ultradurable notebook? At least you can place your own in Port's ThinkPad Sport Case (left). It may not look sturdy, but a peek inside reveals the neoprene shock-absorbing suspension system. It looks pretty sham, too.

ThinkPad Sport Case / Port / (800) 350-7678 /

Go Ahead, Spill Some Coffee: If there's one office-equipment nemesis, it's the offee equ. But you can put your mind at ease if you have Interlink's DuraPoint (center), a hermetically sealed mouse built of stainless steel and heavy rubber. Syncan's 501 Keyboard (left) is spill-resistant. The Commander FIF 122's flat keyboard (right) protects against dust and liquids, and features an interarted mouse.

DuraPoint / Interlink Electronics / (800) 340-1331 / \$279 est, street price / Reader Service No. 647

501 Keyboard / Syncan / (714) 756-3177 / S19 est, street price / Reader Service No. 648

Commander FTF 122 / Preh Electronics / (708) 438-4000 / \$349 est. street price / Reader Service No. 649



the Official Story: "In the last few months we have seen a flurry of interest in Microsoft Corp. [and] our position on issues relating to how we conduct our business . . . . Microsoft is committed to conducting business in a fair and ethical way. Our goal remains to make great software that customers find useful, efficient, exciting,

and fun." —from a "Dear Microsoft Watcher" letter signed by Steve Ballmer, Microsoft's executive vice president of sales and support (April 17, 1995).

The Inside Story Do regular people really think Bill Gates and Steve Ballmer are bloodthirsty, soulless robber barons? Do they think Gates and Company made a pact with the devil, selling an irrevocable,

royalty-free license for their souls way back when MS-DOS 1.0 shipped? Lately, it seems, people are willing to believe that Microsoft is capable of truly evil deeds. Consider the following:

Does Windows 95 actually come in a virus that will sniff through your system and send information about your soft-ware to Microsoft while you're not looking? This bogus rumor started in a computer-industry trade weekly and eventually made it to the mainstream press despite having no basis in fact.

Has Microsoft Network created hidden accounts that allow Microsoft employees to lurk unseen in private chat rooms, listening for any talk that violates the Microsoft party line?

One version of this unlikely story had Bill Gates himself hanging around chat rooms like some sort of Invisible cyber-Man.

Does Microsoft plan to buy the Catholic Church, the Supreme Court, or Intuit? We know none of these mergers and acquisitions will come to pass. After the Catholic Church story took on a life of its own, Microsoft's spin doctors had to issue a press release denying any plans to integrate the Ten Commandments into the Windows 32-bit application program interface.

Guilt by Association I find it alarming that ordinary Americans are willing to believe that Microsoft workers would knowingly participate in schemes that violate the laws of

all 50 states, stands on cer

Look for Windows 95: It was scheduled to go public on August 24, with an extravagant launch party in the Pacific Northwest. Gold masters went to manufacturing on July 14.

the U.S. Constitution, and common sense. But even seasoned Microsoft watchers are willing to buy this point of view. A top editor for a rival computer magazine recently told me, "Whatever you think about the people who work for Microsoft, just don't forget this: They're not nice."

Surely, I thought, this one would be easy to debunk. Somewhere along the line,

Bill and Steve have laid down the basic ethical principles that Microsoft employees are expected to follow.

Boy, was I wrong, When I asked Microsoft's public relations agency for a list of speeches that covered social issues like business ethics, I got this politic reply: 'Business ethics is not a subject that Bill Gates and other senior Microsoft executives have taken on publicly.' And when I asked a few senior executives, off the record, they admitted that the only people at Microsoft who talk about business ethics are the lawyers.

As Microsoft moves from the specialized world of technical products into the mainstream lives of regular people, we have a right to know where the company stands on certain issues.

Issues like competition: Microsoft's silence suggests to many an official philosophy of, "Anything's fair, as long as you make money and don't get caught." Issues like freedom of electronic speech: When Senator James Exon was ready to tack the phrase "unless you're using a modem" onto the end of the First Amendment, where was the outcry from the company that wants to e-mail-enable every human being on the planet? Issues like family values: Showing off a new shoot-'em-up game, a Microsoft marketing executive used the term family values to explain why the game destroyed

only buildings and robots, not human beings. But without any corporate context, it came across as a callous cave-in to the forces of blandness rather than a heroic stand on behalf of kids.

It's impossible to judge the courage of Microsoft's convictions when it seems to have none. It's time for Microsoft to take a stand—or at least strike a pose.

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- 8MB BAM (40MB Max BAM) 256KB L2 Cache
- 420MB Removable Hard Drive
- (1.2GB Max)
- . Smart Lithium Ion Battery with Advanced Power Management
- · 32-bit Local-bus Video.
- 1MB Video RAM · 2 Type II/1 Type III PCMCIA
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- . 1GB Hard Drive (10ms.) . 15LS Monitor (15" CRT, I
- · 9FX Motion Graphics A
- 4X Multi-session EIDE 00
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